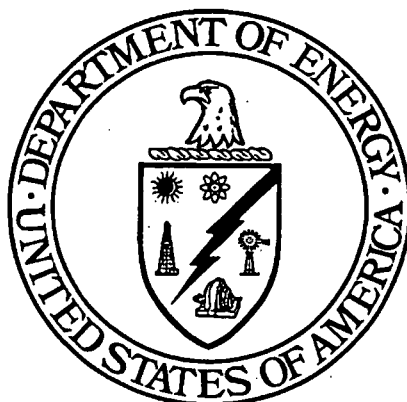


PROJECT SPECIFIC PLAN FOR PREDESIGN INVESTIGATION IN AREA 5

SOIL AND DISPOSAL FACILITY PROJECT

**FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO**



AUGUST 13, 2002

**U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE**

**20810-PSP-0005
REVISION 0**

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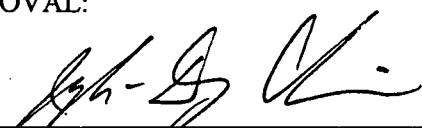
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20810-PSP-0005


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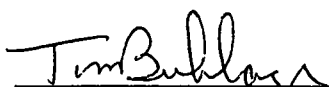
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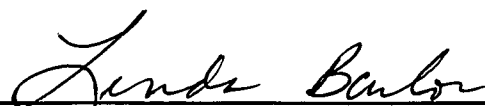
Jyh-Dong Chiou, Project Manager
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Tom Buhlage, Environmental Monitoring
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Waste Management Project
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FERNALD ENVIRONMENTAL MONITORING PROJECT

Fluor Fernald, Inc.
P.O. Box 538704
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LIST OF ACRONYMS AND ABBREVIATIONS

A5	Area 5
A5A	Area 5 Administrative side
A5A-EF	Area 5 Administrative side - Eastern Field
A5P	Area 5 Production side
amsl	above mean sea level
ASCOC	area-specific constituent of concern
ASL	analytical support level
ccpm	corrected counts per minute
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	constituent of concern
DOE	U.S. Department of Energy
DQO	Data Quality Objective
FACTS	Fernald Analytical Computerized Tracking System
FEMP	Fernald Environmental Management Project
FRL	final remediation level
IRDP	Integrated Remedial Design Package
MDC	minimum detectable concentrations
µg/kg	micrograms per kilogram
mg/kg	milligram per kilogram
OSDF	On-Site Disposal Facility
PAH	polynucleararomatic hydrocarbon
PCB	polychlorinated biphenyl
pCi/g	picoCuries per gram
ppb	parts per billion
PSP	Project Specific Plan
QA/QC	Quality Assurance/Quality Control
RI/FS	Remedial Investigation/Feasibility Study
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SDFP	Soil and Disposal Facility Project
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan
SPL	Sample Processing Laboratory
TAL	Target Analyte List
V/FCN	Variance/Field Change Notice
WAC	waste acceptance criteria
WAO	Waste Acceptance Organization

1.0 INTRODUCTION

1.1 BACKGROUND

Former production operations at the Fernald Environmental Management Project (FEMP) resulted in widespread soil contamination within the Former Production Area and other parts of the Fernald site. For the purpose of conducting soil remediation, the FEMP was divided into manageable remediation areas. Soil Remediation Area 5 (A5) generally covers the Administrative Area of the site, though the northern portion of A5 extends beyond the Production Area exclusion fence into "controlled" areas of the site. Refer to Figure 1-1 for a map identifying the A5 boundaries.

The predominant surface features in A5 include the main parking lot, along with paved sidewalks and roads that surround small grassy areas, including a 3.19-acre field at eastern end of A5. The majority of the main parking lot has been present since site the mid-1950s; however, the northwestern quarter of the west parking lot was added in the mid-1980s. The structures located or formerly located within A5 include the Services Building, the Health and Safety Building, the Administrative Building, the Security/Industrial Relations Building, the main production area entrance point, as well as numerous trailers. For purpose of clarity in this Project Specific Plan (PSP), the controlled portion of A5 will be known as the A5 Production side (A5P); and the uncontrolled portion of A5 will be known as the A5 Administrative side (A5A). Note that the area inside the construction zone boundary fence currently in place around the Health and Safety Building demolition has been included in A5P due to access restrictions. Figure 2-1 illustrates the boundary between A5A and A5P.

During the FEMP's Remedial Investigation/Feasibility Study (RI/FS), extensive soil sampling was conducted, specifically focused in areas where production knowledge indicated increased likelihood for soil contamination. During the planning stages for this PSP, all existing constituent of concern (COC) data in A5 were plotted to identify exceedances of final remediation levels (FRLs) and the On-Site Disposal Facility (OSDF) waste acceptance criteria (WAC). This effort also allowed for the identification of "data gaps", or areas where more soil sampling was necessary to better define the extent of soil contamination. As Figure 1-2 illustrates, extensive soil sampling was performed within A5P; however, relatively few samples were collected outside the Production Area exclusion fence, leaving large data gaps in A5A. All historical A5 area-specific constituent of concern (ASCOC) data are provided in Appendix A.

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Other than airborne deposition, there is no identifiable mechanism for contamination of A5A. Therefore, it is anticipated that much of the soil will not contain above-FRL contamination. This is the case with the grassy area on the eastern portion of A5A (hereinafter referred to as the A5A Eastern Field, or A5A-EF).

1.2 PURPOSE

The purpose of this PSP is to guide the collection of predesign investigation sampling within A5, with the goal of identifying the extent of soil contamination in order to develop an Integrated Remedial Design Package (IRDP). This includes collecting additional ASCOC information for A5 to fill data gaps, and to bound soil contaminated above the FRL (with both uranium and non-uranium constituents) both horizontally and at depth. The Variance/Field Change Notice (V/FCN) process will be used to collect additional data, as warranted, to meet this purpose. All data collected under this PSP will be incorporated into a 3-D computer model to help establish the remedial excavation footprint.

1.3 SCOPE

The scope of this PSP includes the collection of all additional samples within all of A5 necessary to support development of the IRDP. Specifically, this includes biased and random sampling within A5A, as well as biased sampling to investigate and bound non-uranium FRL exceedances in A5B not captured within the modeled total uranium remediation footprint. The V/FCN process will be used to add additional samples/borings to the scope of this investigation, as necessary, to achieve the purpose identified above.

Sampling activities carried out under this PSP will be performed in accordance with the Sitewide Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Quality Assurance Project Plan (SCQ), the Sitewide Excavation Plan (SEP), the WAC Attainment Plan for the OSDF, and Data Quality Objective (DQO) SL-048, Revision 5. Additionally, sample collection, analysis and validation of all samples collected in A5A will meet requirements of DQO SL-049, Revision 1. Both DQOs are included as Appendix B of this PSP.

1.4 KEY PROJECT PERSONNEL

The key project personnel are listed in Table 1-1.

**TABLE 1-1
KEY PERSONNEL**

Title	Primary	Alternate
DOE Contact	Robert Janke	Kathi Nickel
SDFP Management	Jyh-Dong Chiou	Tom Beasley
Characterization Manager	Frank Miller	Eric Kroger
Field Sampling Lead	Tom Buhrlage	Jim Hey
Surveying Manager	Jim Schwing	Andy Clinton
WAO Contact	Linda Barlow	TBD
Laboratory Contact	Denise Arico	Justin Burke
Data Management Lead	Eric Kroger	Krista Blades
Field Data Validation Contact	Andy Sandfoss	Jim Chambers
Data Validation Contact	Jim Chambers	Hobert Jones
FACTS/SED Database Contact	Cara Sue Schaefer	Susan Marsh
Quality Assurance Contact	Reinhard Friske	Mike Godber
Health and Safety Contact	Gregg Johnson	Jeff Middaugh/ Pete Bolig

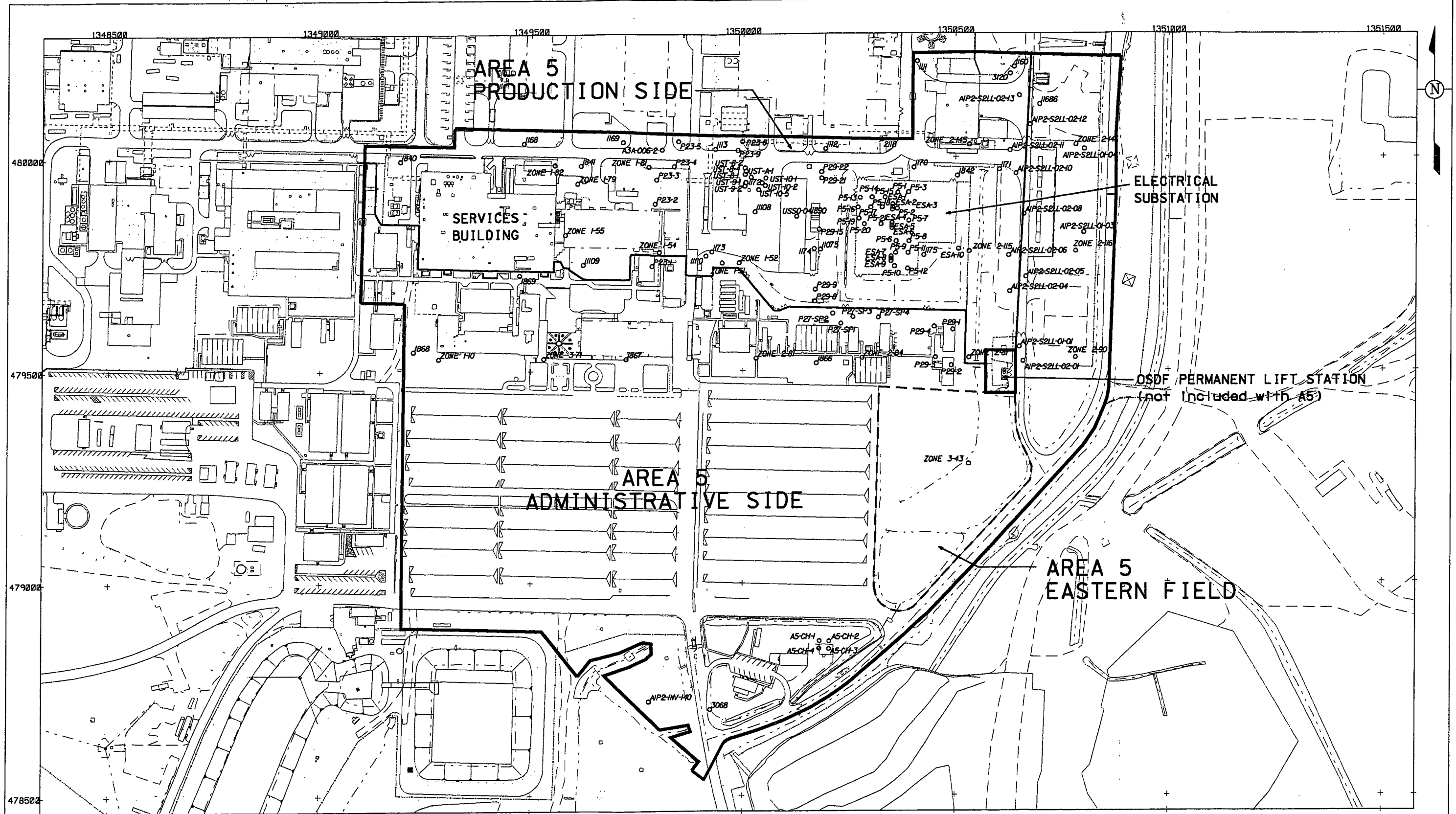
FACTS – Fernald Analytical Computerized Tracking System

SDFP – Soil and Disposal Facility Project

SED – Sitewide Environmental Database

WAO – Waste Acceptance Organization

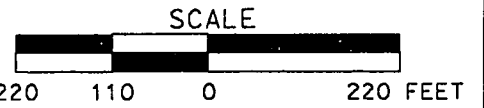
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LEGEND:

- PREVIOUS SAMPLING LOCATIONS
- AREA 5 BOUNDARY

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DRAFT

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STATE PLANAR COORDINATE SYSTEM 1983

06-AUG-2002

FIGURE 1-2.
PREVIOUS A5 SAMPLING LOCATIONS AND
SUBDIVISIONS OF A5 FOR THIS PSP

2.0 PHYSICAL SAMPLING STRATEGY

2.1 SAMPLING STRATEGY

The sampling strategy identified in this PSP has been established to meet the objectives presented in Section 1.2, and is consistent with the SEP. Due to the varying uses of data collected from A5A and A5P, the sampling strategies will also be unique to each.

2.1.1 Sampling Strategy for A5A

As shown in Figure 1-2, there is very little historical data available from within A5A. Therefore, the majority of samples collected under this PSP will be for the purpose of filling this large data gap in support of the A5 predesign investigation. In order to select sample locations within A5A, the area was divided into 26 grid blocks of approximately 60,000 ft². Three of these grid blocks cover A5A-EF, as discussed in Section 2.1.2. For the other 23 grid blocks in A5A, four sample locations were randomly selected within each, for a total of 92 sampling locations (see Figure 2-1). This sampling density will provide a greater quantity of data than is present in any other parts of the site where contamination is not known to be present. When identifying the random sampling locations, additional measures were taken to avoid existing buildings, trailers, and other surface features that prevented sampling at this time. In several instances, a biased location was identified in place of a random location where surface depressions or other drainage features indicated the increased possibility of contamination. This includes three biased locations immediately adjacent to abandoned storm sewer lines in the west parking lot. The depth of these samples will be established by measuring the depth of the line at the nearest connecting manhole, then sampling at the next deepest 6-inch increment below that depth.

The sample collection at the A5A sampling locations will be accomplished in one of two manners, depending of whether the location is paved (asphalt or cement) or unpaved (grass, bare soil or gravel). Note that the paved/unpaved distinction is only used for sampling strategy. For the purposes of sample depth identification (as discussed in Section 2.2), overlying material (i.e., gravel) may still be present at an "unpaved" location. Sampling protocol for paved versus unpaved locations is as follows:

- Unpaved Locations (51): Soil samples will only be collected at surface (0 to 0.5-foot) at the unpaved sampling locations. If gravel is present (locations 13, 58, 60, 61, 79, 80, and 81), the first 6 inches of soil beneath the gravel will be collected.

Note: Location 23 is present in an area where clean fill (soil brought in from an off-site location) was used to backfill an area where office trailers were removed in 2001. To avoid sampling the fill, it will be treated as overlying material (see Section 2.2 and Appendix C). The sample will consist only of native soil from beneath the fill.

- Paved Locations (41): Because all pavement, along with any gravel sub-base, plus the underlying 6 inches (minimum) of soil will be removed as part of soil remediation, samples will be collected by Geoprobe® at 0.5 to 1 feet beneath the overlying material. An additional sample will be collected at 1.5 to 2 feet below pavement to minimize the need to resample through overlying material should the 0.5 to 1-foot sample reveal above-FRL contamination. Also:
 - Since fill soil may also be present beneath the parking lot, a Geologist must verify that sampling is conducted to native soil at each boring location. If the deepest identified sample does not contain native soil, the boring will be continued until native soil is reached, and an additional sample will be collected from the first 6-inch increment containing all native soil. This sample will be analyzed for the same TAL as other samples collected from that boring (see Appendix C).
 - At the three locations adjacent to abandoned storm sewer lines, a third sample will be collected at the same depth as the bottom of the as the sewer line. This depth will be established in the field by measuring the depth to the bottom of the drainpipe at the nearest manhole.

All surface and immediate subsurface samples (those collected up to 2 feet below overlying material) will be analyzed for primary radiological COCs. The samples collected at one-fourth (23) of the locations will also be analyzed for beryllium, arsenic, aroclor-1254 and aroclor-1260 (the A5 secondary ASCOCs). Finally, samples collected from ten locations spanning the parking area will be analyzed for polynucleararomatic hydrocarbons (PAHs) (all of those retained as Sitewide Soil COCs in Table 2-6 of the SEP) to evaluate their concentrations due to the presence of asphalt, plus many years of vehicular traffic. The three samples collected adjacent to abandoned sewer lines (i.e., the deepest samples collected at locations A5A-26, -29, and -57) will be analyzed for technetium-99 and total uranium only. The prescribed analysis for each sample is listed in Appendix C. All Target Analyte Lists (TALs) are provided in Appendix D.

2.1.2 Sampling Strategy for A5A-EF

The A5A-EF represents the planned future location of the OSDF Sediment Basin #2. Only one historical soil sample (Zone 3-43) has been collected from the A5A-EF, and it showed no FRL exceedances. A greater density of sampling will provide very comprehensive and accurate information about surface soil

ASCOC concentrations in this part of the site. Within the three A5A-EF grid blocks, random sample locations were identified at a density of 12 per block (see Figure 2-1). Note that there were two locations that fell in close proximity to the northern-most drainage ditch (A5A-EF16 and EF19). These locations were moved into the base of the ditch to investigate impacts from potentially contaminated surface water drainage (originating from the eastern end of the Production Area).

Surface (0 to 0.5 feet) samples will be collected at each of the 36 locations shown on Figure 2-1 (all are unpaved). Three duplicate samples will also be collected at the locations identified in Appendix C. Locations 1 through 12, 13 through 24, and 25 through 36 (including the associated duplicates) will be batched into three analytical releases. The 13 samples from each of the three releases (39 samples total) will be analyzed for all primary radiological.

Because the northern-most drainage ditch has carried potentially impacted drainage originating from the eastern edge of the production Area, it is prudent to collect several deep borings in the vicinity of this ditch to verify that there is no contamination at depth. The western edge of this ditch near where it enters the culvert represents the most ideal location for this since some pooling of storm water occurs in this area, thus representing the most likely point for sub-surface impacts. Therefore, three deep boring (locations A5A-EF101, EF102 and EF103) will be conducted at biased locations along the western end of the northern-most drainage ditch, as shown on Figure 2-2. Additional considerations for selecting these locations include Geoprobe accessibility and avoidance of subsurface utility lines. Each of these borings will be conducted to a depth equal to the 570.5 above mean sea level (amsl) elevation, as 570.5 is the bottom depth of the planned OSDF Sediment Basin #2. Samples will be collected every 3 feet, beginning at 2.5 to 3 feet below surface, and ending with the 6-inch depth increment at 570.5 amsl. All samples will be analyzed on-site for total uranium. A portion of each core will be archived, and if any total uranium results are elevated (as determined by the Characterization Lead) they will be submitted to an off-site laboratory for analysis of all primary radiological COCs.

2.1.3 Sampling Strategy for A5P

Unlike the other portions of A5, extensive historical soil data are available within A5P (see Figure 1-2). The only data gap lies in the footprint of the Services Building, which cannot be sampled at this time. Therefore, the purpose of predesign investigation sampling in this area is to investigate existing

non-uranium FRL exceedances that lie outside of the current modeled total uranium excavation or other planned excavations.

To establish what locations require investigation, borings with non-uranium FRL exceedances were plotted along with the modeled soil excavation boundary [50 milligrams per kilogram (mg/kg) total uranium footprint]. This effort revealed that all non-uranium FRL exceedances in A5P lie within the planned soil excavation boundary, except for boring 11109 (just south of the Health and Safety Building; beryllium and radium-226 FRL exceedances) and boring ESA-10 (near the electrical substation; aroclor-1254 FRL exceedance). However, the remedial excavations in the vicinity of boring 11109 extend to a depth of approximately 8 feet below surface and almost 100 feet in the nearest direction (south). This large excavation is necessary to capture building foundations, underground utilities, and to allow for drainage corridors and safe slope. As a result, this effectively eliminates the need to bound this boring since the soil in this area will be excavated and disposed in the OSDF regardless of the extent of FRL contamination. Therefore, only boring ESA-10, located near the main electrical substation, requires further investigation.

There is very little information about potential polychlorinated biphenyl (PCB) contamination in the vicinity of the electrical substation (formerly part of Area 7, now included with A5), where this type of contamination could be expected. While a large number of samples were collected in and around this area during the RI/FS, many samples did not include PCB analysis. And when PCBs were analyzed, the laboratory minimum detectable concentrations (MDCs) were often greater than the FRL of 130 mg/kg. In fact, the subject aroclor-1254 result at ESA-10 [200 parts per billion (ppb), 0 to 0.5-foot depth] is the only detected result for either aroclor-1254 or aroclor-1260 in this area. To further investigate PCB concentrations in the vicinity of the A5 electrical substation, 12 boring locations (see Figure 2-3) have been identified in and around the area, as follows:

- Borings A5P-1 through A5P-6 are located at the north and south ends of each of the three transformers
- Borings A5P-7 through A5P-9 are located at the northwest, northeast and southwest corners of the substation; borings around ESA-10 (see below) cover the southeast corner
- Borings A5P-10 through A5P-12 are located 10 feet to the north, east, and south of RI/FS boring ESA-10 to bound potential PCB contamination away from the substation area.

All borings will be conducted to 3 feet below the concrete pad (where present), and samples will be collected at 0 to 0.5-foot and 2.5 to 3-foot depth intervals below the concrete. These samples will be analyzed for TAL C (aroclor-1254 and aroclor-1260). To also investigate PAH concentrations in this part of the site, an additional sample (separate container) will be collected at each location and analyzed for all PAHs retained in the SEP as Sitewide Soil COCs (TAL F). The data from these samples will be used to determine if additional soil excavations are necessary to remove contaminated soil in this area.

2.2 SAMPLE COLLECTION METHODS

Soil sampling will be conducted in accordance with procedure SMPL-01, Solids Sampling. Surface samples will be collected using 3-inch plastic or stainless steel core liners, or an alternate method as identified in SMPL-01. Sampling at depth will be completed using the Geoprobe® Model 5400, or an alternate method identified in SMPL-01. The dual tube will not have to be used unless the macro-core is not sufficient for collection of the identified core. Ultimately, the method of sample collection will be left to the discretion of the field sampling lead. If refusal or resistance is encountered during sample collection, the location may be moved within a 3-foot radius of the identified sample location, unless precluded by the penetration permit. If a sample planned at a paved location requires a move to an unpaved location, it will still be sampled as a paved location (i.e., samples collected at 0.5 to 1 feet and 1.5 to 2 feet, etc.). However, if a sample planned for grass must be moved to a paved location, it will be sampled as a paved location and documented in a V/FCN, per Section 3.4. If any point is moved more than 3 feet from the originally planned sample point, the change must be documented on a V/FCN form.

Alpha-beta screen samples will also be collected at ten percent of the sampling locations within A5A. The 13 samples were selected to provide wide coverage and to represent the varying surface conditions (e.g., parking lots, fields, gravel, etc.), with further bias toward locations with the greatest potential for contamination (based on available information, drainage, and prevailing wind direction). The alpha-beta screen samples are specified in Appendix C. When an alpha-beta sample is specified at locations where multiple samples will be collected, the alpha-beta sample will be collected from the interval with the highest beta-gamma activity (the beta-gamma frisker scan is discussed below). Historical data, since it is available, will be used in lieu of alpha-beta screens in A5P.

For samples collected in the A5A, two container blanks will be collected (one at the beginning and one at the end of the project). Rinsates will also need to be collected at a frequency of one per 20 samples where sampling equipment is decontaminated in the field.

When sampling below overlying material (e.g., gravel, asphalt, etc.), the uppermost sampling interval will begin where the soil contains less than 50 percent overlying material. Because sample intervals are recorded in even 6-inch intervals and sample identification numbers include a depth designation that corresponds to each 6-inch interval, material overlying the uppermost sampling interval will be identified in 6-inch depth intervals. Any overlying material interval of less than 3 inches will be included as part of the previous interval. Any interval greater than 3 inches but less than 6 inches will be recorded as a separate interval and rounded to the next 6-inch interval measurement. For example, 8 inches of overlying material would be recorded as a single 6-inch interval, while 9 inches of overlying material would be recorded as two 6-inch intervals. Because the ultimate goal of this sampling effort is to define the excavation depth, the potential 3-inch discrepancy introduced by rounding the depth of overlying material will not be significant during excavation with heavy equipment.

The entire length of all soil cores collected will be surveyed with a beta/gamma (Geiger-Mueller) survey meter and results will be recorded as part of the field documentation. In the unlikely event that the field screening results from the deepest sample interval identified for collection in Appendix C exceed 450 corrected counts per minute (ccpm), it is considered potential above-WAC material, and another sample will be collected 3 feet below that interval. That sample will also be submitted for total uranium analysis (TAL E). This process will be repeated until the deepest interval collected scans less than 450 ccpm.

Following soil core collection (and beta/gamma screening), the appropriate sample intervals will be separated from each core (see Section 2.1 or Appendix C). Note that the appropriate volume of sample must be separated into two containers when radiological and chemical analyses are specified. Sampling and analytical requirements are summarized in Table 2-1. All samples will be taken to the Sample Processing Laboratory (SPL), where they will be prepared for shipment to an off-site laboratory for analysis. Sample volumes, preservation requirements and analysis information are summarized in Table 2-1. If a 6-inch interval contains insufficient soil mass for the necessary analyses, additional material can be obtained by performing an additional push.

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Because all samples collected under this PSP will be analyzed off-site, the Sampling Technicians must collect three-times the soil volume for one sample per release so the contract laboratory can perform the required laboratory Quality Control analyses. For A5A-EF, this volume should be obtained at the three duplicate locations (i.e., collect a total of four cores at locations A5A-EF-11, -15 and -30: the normal, the duplicate, and two extra pushes to provide triple volume for the normal). For other sampling performed under this PSP, the locations/samples where the triple-volume is collected is left to the discretion of the field sampling lead.

Sampling personnel will provide a physical description of the material, consisting of general color, material type, frisker readings, and foreign material, at each 6-inch interval of each boring. If anomalous material is found in the boring, then a geologist will be notified to further define the material's characteristics. Full lithological characterization by a geologist, including Munsell chart, grain size, moisture, plasticity, and density, will not be performed on every boring.

2.3 SAMPLE IDENTIFICATION

All physical samples collected for laboratory analysis or archiving will be assigned a unique sample identifier, as listed in Appendix C. This identifier will consist of the following:

1. Area Designator: Identifies the remediation area where the sample is collected (Area 5 Production side = ASP; Area 5 Administrative side = A5A).
2. Location Designator: This will simply be a sequential boring number (e.g., -1, -2, etc) that follows the area designator (e.g. A5P-4, A5A-1, A5A-72). For samples collected from the A5A-EF, the "EF" designator will precede the sequential number (e.g., A5A-EF1, A5A-EF2, etc.).
3. Depth Interval Designator: When the sample is collected from an area without overlying material (i.e., no cement, asphalt, or gravel), this will be a number to indicate depth ("1" = 0 to 0.5 feet, "2" = 0.5 to 1 feet, etc.). When collecting a sample from a location with overlying material, this will be a sequential letter (a, b, c, etc.) to denote the sample collected at varying depths beneath overlying material. This letter will later be replaced in the field with a number to designate the actual depth below surface once the depth of overlying material is known. This number will be equal to *two times the bottom depth (ft) of the interval below surface* (refer to Appendix C).

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4. Measurement Designator: R = Radionuclide analysis
M = Metals analysis
P = PCB analysis
S = Semi-volatile organic (i.e., PAH) analysis
AB = Alpha-beta screen
5. Quality Control Designator: D = Duplicate sample
X = Rinsate sample
Y = Container blank

For example, A5A-31-b-R is the 1.5 to 2-foot sample interval collected at the 31st location in A5A, and will be analyzed for primary radiological COCs. A5A-EF17-1-RMP is the surface sample collected from the 17th location in the A5A-EF, and will be analyzed for radiological COCs, metals, and PCBs. If the 0.5 to 1-foot sample below pavement at location 40 were found to have the highest beta-gamma activity, the alpha beta screen at that location would be identified as A5A-40-a-AB, and "a" would be replaced with the same depth identifier as the sample.

If a boring location requires multiple borings due to subsurface refusal, or if a boring is moved after attempting the original location, the boring identifier will be designated with an alphabetical suffix (e.g., A5P-1-6A, A5P-1-6B, etc.). Unless refusal is experienced in the first push of the Geoprobe®, samples collected from a boring prior to experiencing refusal will be kept, and sample collection will resume beyond the refusal depth at a subsequent successful boring.

2.4 EQUIPMENT DECONTAMINATION

Decontamination is performed on the sampling equipment to protect worker health and safety and to prevent the introduction of contaminants into subsequent soil samples. Sampling equipment will be decontaminated prior to transport to the field site, between sample locations, and after sampling performed under this PSP is completed. Equipment that comes into contact with sample material will be decontaminated at Level II (Section K.11, SCQ). Other equipment that does not contact sample media may be decontaminated at Level I, or wiped down using disposable towels. Clean disposable wipes may be used to replace air drying of the equipment.

2.5 WASTE DISPOSITION

Excess soil from the borings will be dispersed on the ground or gravel surface in the same general area of the boring, based on direction from WAO. Any water (used decontamination water, etc.) generated

during sampling must be containerized and documented on a completed Wastewater Discharge Request Form (FS-F-4045) before disposal. Any non-soil solid waste generated from the sampling effort will be documented and disposed in accordance with applicable requirements for each boring location, as determined by WAO.

2.6 BOREHOLE ABANDONMENT

Each borehole will be plugged using bentonite pellets or a bentonite grout slurry immediately after sampling is completed, in accordance with DRL-01, Plugging and Abandonment. Any concrete or asphalt that is removed will be replaced with an equal thickness of cement. A Borehole Abandonment Log will be completed for each borehole greater than 6 inches in depth.

TABLE 2-1
SAMPLING AND ANALYTICAL REQUIREMENTS

Analytes	Sample Matrix	Lab	ASL	Preservation	Holding Time	Container	Min. Sample Volume/Mass ^a
Primary Radiological COCs (TAL A)	Solid	Off-site	D	None	12 months	Plastic or stainless steel core liners; or glass or polyethylene	400g
Primary Radiological COCs plus Arsenic Beryllium Aroclor-1254 Aroclor-1260 (TAL B)	Solid	Off-site	D	Cool to 4°C	12 months (rads) 6 months (metals) 14 days (PCBs)	Glass w/ Teflon-lined lid (due to PCBs)	450g ^b
TAL B - Same as above; separate containers for rads/metals and PCBs	Water	Off-site	D	HNO ₃ to pH<2 (rads and metals)	6 months (rads and metals)	Glass or Plastic (rads and metals)	3 Liters (L) (rads and metals)
				Cool to 4°C (PCBs)	7 days (PCBs)	Amber glass (PCBs)	2 L (PCBs)
Aroclor-1254 Aroclor-1260 (TALs C)	Solid	Off-site	B	Cool to 4°C	14 days	Glass w/ Teflon-lined lid	30g
Total Uranium Technetium-99 (TAL D)	Solid	Off-site	D	None	12 months	Glass or polyethylene	100g
Total Uranium (TAL E)	Solid	On-site	B	None	12 months	Glass or polyethylene	20g
PAHs (TAL F)	Solid	Off-site	B	Cool, 4°C	14 Days	Glass with teflon-lined cap	100g
Alpha/Beta Screen	Solid	SPL	NA	None	NA	Any	10g

ASL – analytical support level

^a Triple the specified volume must be collected for one sample per release (see Section 2.2) in order for the contract laboratory to perform the required quality control analysis.

^b Mass can be collected and submitted as one sample, despite multiple analytical suites.

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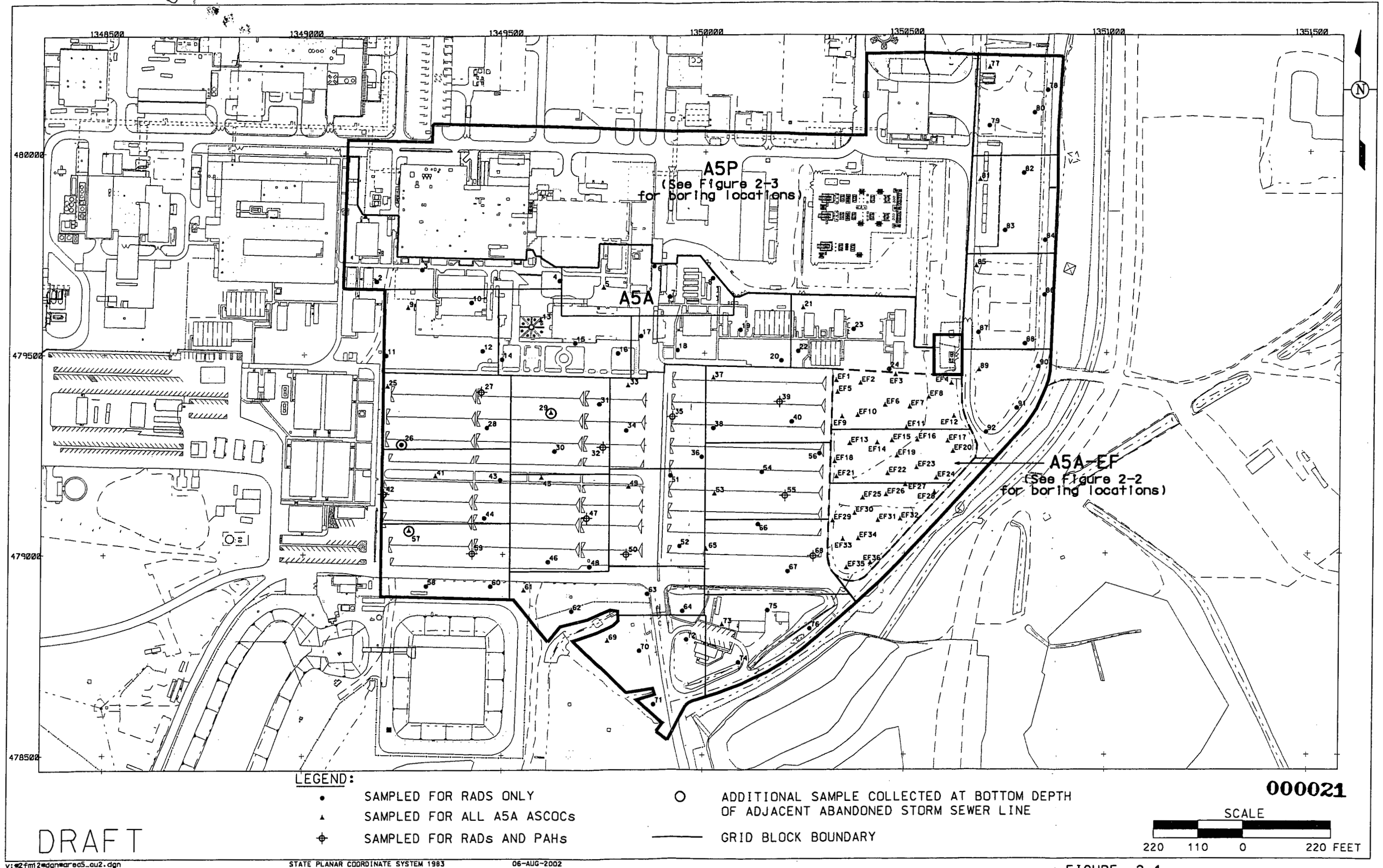


FIGURE 2-1.
SAMPLE LOCATIONS FOR THE A5A
AND A5A-EF PRE-DESIGN INVESTIGATION

V:\22\2400\2400.dwg

STATE PLANNING COORDINATE SYSTEM 1983

06-AUG-2002

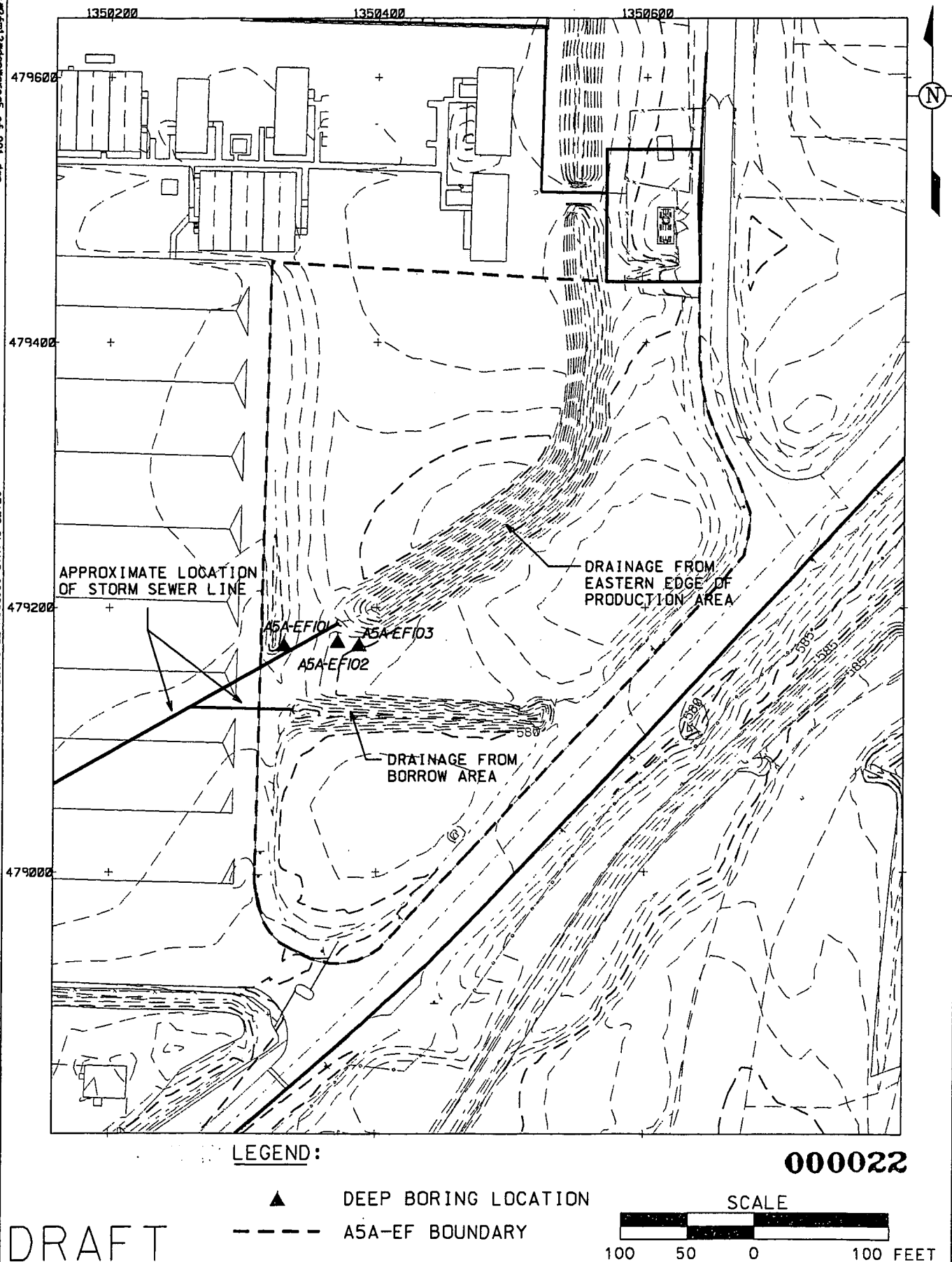


FIGURE 2-2. DEEP BORINGS IN A5A-EF TO INVESTIGATE SUBSURFACE CONDITIONS

V:\22\fm\2\acq\bor\ing\ss\l\eo_sub_001.dgn

STATE PLANNING COORDINATE SYSTEM 1983

06-AUG-2002

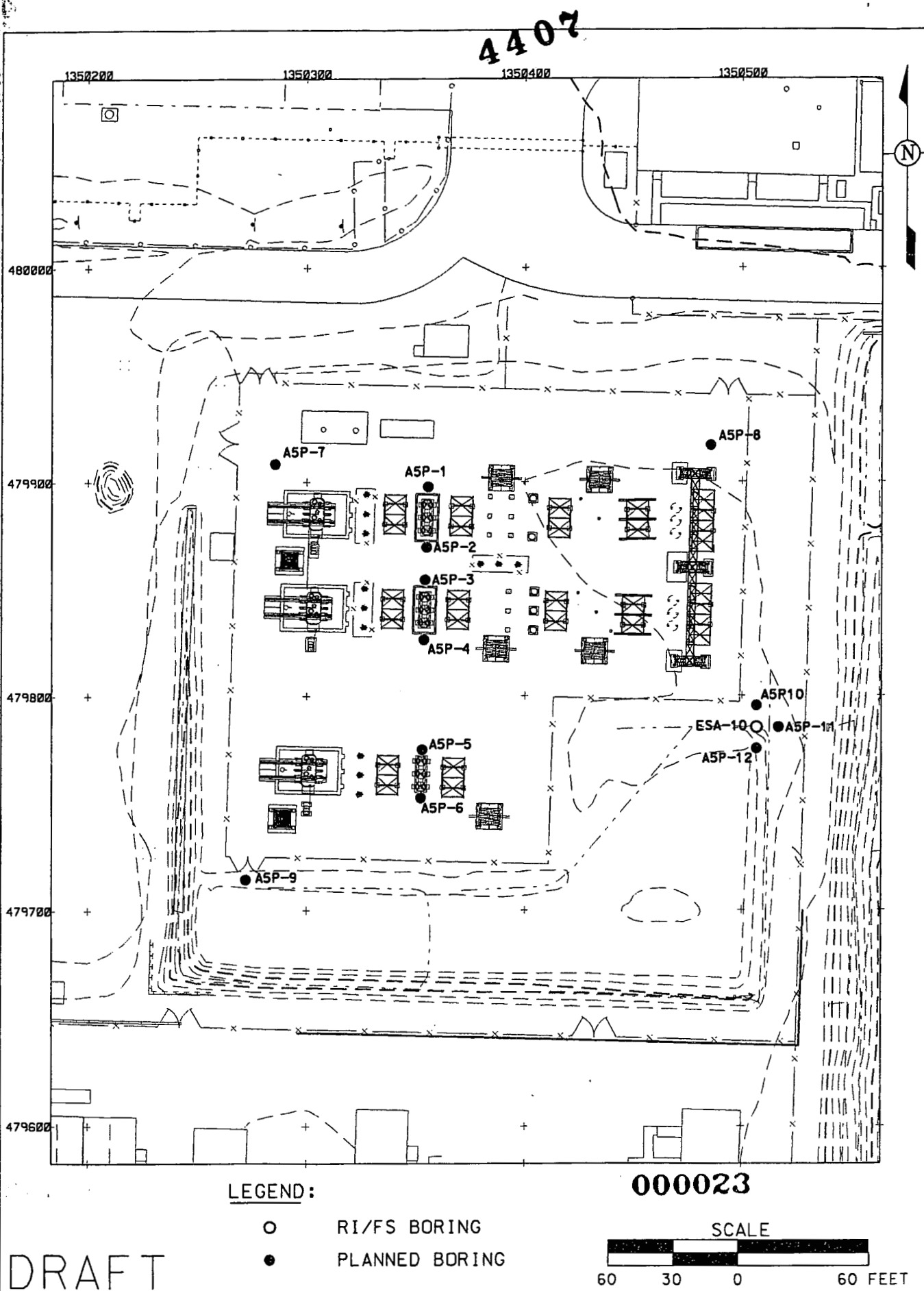


FIGURE 2-3. BORINGS TO INVESTIGATE PCB CONTAMINATION
IN THE VICINITY OF THE ELECTRICAL SUBSTATION IN A5P

3.0 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

3.1 FIELD QUALITY CONTROL SAMPLES, ANALYTICAL REQUIREMENTS AND DATA VALIDATION

In accordance with the requirements of DQO SL-048, Revision 5 and SL-049, Revision 1 (see Appendix B), the field quality control, analytical, and data validation requirements are as follows:

- All laboratory analyses will be performed at ASL D (ASLs are defined in the SCQ), with the exception of those samples collected from A5P, which will be analyzed to ASL B.
- Equipment rinsate and container blank samples will only be collected while sampling A5A, and analyzed for all A5 ASCOCs (TAL B). Three duplicate soil samples will be collected from A5A-EF, as identified in Appendix C.
- All field data will be validated. All analytical data will require a certificate of analysis, and 10 percent of the analytical data will also require the associated quality assurance/quality control results, and will be validated to ASL D. In the case of A5P samples, the 10 percent will be validated to level B. The 10 percent analytical data requiring validation will be designated by the Characterization Lead.

If any sample collection or analysis methods are used that are not in accordance with the SCQ, the Project Manager and Characterization Lead must determine if the qualitative data from the samples will be beneficial to predesign decision making. If the data will be beneficial, the Project Manager and Characterization Lead will ensure that:

- the PSP is varianced to include references confirming that the new method is sufficient to support data needs,
- variations from the SCQ methodology are documented in the PSP, or
- data validation of the affected samples is requested or qualifier codes of J (estimated) and R (rejected) be attached to detected and non-detected results, respectively.

3.2 APPLICABLE PROCEDURES, MANUALS AND DOCUMENTS

To assure consistency and data integrity, field activities in support of this PSP will follow the requirements and responsibilities outlined in controlled procedures and manufacturer operational manuals. Applicable procedures, manuals, and documents include:

- SMPL-01, Solids Sampling
- SMPL-02, Liquids and Sludge Sampling
- SMPL-21, Collection of Field Quality Control Samples
- DRL-01, Plugging and Abandonment
- EQT-04, Photoionization Detector
- EQT-06, Geoprobe® Model 5400 Operation and Maintenance Manual
- EW-0002, Chain of Custody/Request for Analysis Record for Sample Control
- 9501, Shipping Samples to Off-Site Laboratories
- 9505, Using the FACTS Database to Process Samples
- 7532, Analytical Laboratory Services Internal Chain of Custody
- RM-0020, Radiological Control Requirements Manual
- RM-0021, Safety Performance Requirements Manual
- Sitewide CERCLA Quality Assurance Project Plan (SCQ)
- Sitewide Excavation Plan (SEP)
- WAC Attainment Plan for the OSDF

3.3 PROJECT REQUIREMENTS FOR INDEPENDENT ASSESSMENTS

Project management has ultimate responsibility for the quality of the work processes and the results of the sampling activities covered by this PSP. Project management can schedule independent assessments of the work processes or operations to assure quality of performance. Assessment will encompass project requirements as defined in this PSP and the SCQ.

3.4 IMPLEMENTATION OF FIELD CHANGES

If field conditions require changes or variances, the Characterization Lead must prepare a V/FCN. The completed V/FCN must contain the signatures of all affected organizations, which at a minimum includes the Project Manager, Characterization Manager, WAO, and QA/QC but may also include Field Sampling and/or the Analytical Program Manager, as appropriate. A time-critical variance may be obtained in cases where expedited approval is needed to avoid costly project delays. In the case of a time-critical variance, verbal or written approval (electronic mail is acceptable) must be received from the Characterization Lead and from QA/QC prior to implementing the variance. The completed approved V/FCN form must be completed within five working days after the time-critical variance is approved.

All significant field changes (sample moves greater than 3 feet, changes from SEP strategy, etc.) require regulatory agency approval.

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4.0 HEALTH AND SAFETY

The Health and Safety Lead, Field Sampling Leads, and team members will assess the safety of performing sampling activities in the vicinity of each boring location. This will include vehicle/equipment positioning limitations and fall hazards.

Technicians will conform to precautionary surveys performed by Radiological Control, Safety, and Industrial Hygiene personnel. All work on this project will be performed in accordance with applicable Environmental Monitoring procedures; RM-0020 (Radiological Control Requirements Manual), RM-0021 (Safety Performance Requirements Manual), Fluor Fernald work permit, Radiological Work Permit, penetration permit and other applicable permits. Concurrence with applicable safety permits (as indicated by the signature of each field team member assigned to this project) is required by each team member in the performance of their assigned duties.

The Field Sampling Lead will ensure that each technician performing work related to this project has been trained to the relevant sampling procedures including safety precautions. Technicians who do not sign project safety and technical briefing forms will not participate in any activities related to the completion of assigned project responsibilities. A copy of applicable safety permits/surveys issued for worker safety and health will be posted in the affected area during field activities.

A safety briefing will be conducted prior to the initiation of field activities. All emergencies will be reported immediately to the site communication center at 648-6511 by cell phone, 911 on-site phone, or by contacting "control" on the radio.

5.0 DATA MANAGEMENT

A data management process will be implemented so information collected during the investigation will be properly managed to satisfy data end use requirements after completion of the field activities. As specified in Section 5.1 of the SCQ, sampling teams will describe daily activities on a Field Activity Log, which should be sufficient for accurate reconstruction of the events without reliance on memory. Sample Collection Logs will be completed according to protocol specified in Appendix B of the SCQ and in applicable procedures. These forms will be maintained in loose-leaf form and uniquely numbered following the sampling event. At least weekly, a copy of all field logs will be sent to the Characterization Lead.

All field measurements, observations, and sample collection information associated with physical sample collection will be recorded, as applicable, on the Sample Collection Log, the Field Activity Log, and the Chain of Custody/Request for Analysis Form, as required. The method of sample collection will be specified in the Field Activity Log. Borehole Abandonment Logs are required. The PSP number will be on all documentation associated with these sampling activities.

Samples will be assigned a unique sample number as explained in Section 2.3 and listed in Appendix C. This unique sample identifier will appear on the Sample Collection Log and Chain of Custody/Request for Analysis and will be used to identify the samples during analysis, data entry, and data management.

Technicians will review all field data for completeness and accuracy and then forward the data package to the Field Data Validation Contact for final review. The field data package will be filed in the records of the Environmental Management Project. Analytical data that is designated for data validation will be forwarded to the Data Validation Group. The PSP requirements for analytical data validation are outlined in Section 3.1. Analytical data from the on- and off-site laboratories will be reviewed by the Data Management Lead prior to transfer of the data to the SED from the FACTS database.

Following field and analytical data validation, the Sample Data Management organization will perform data entry into the SED. After entry into the SED, a data group form will be completed for each material tracking location (as identified by WAO) and transmitted to WAO for WAC documentation.

APPENDIX A

AREA 5 HISTORICAL ASCOC DATA

**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
11108	19930724	0	0.5	580.2	479873.665	1350027.391	Aroclor-1254	130	ug/kg	39	U	ug/kg	Normal	None
11108	19930724	1	1.5	580.2	479873.665	1350027.391	Aroclor-1254	130	ug/kg	38	U	ug/kg	Normal	None
11108	19930724	2.5	3	580.2	479873.665	1350027.391	Aroclor-1254	130	ug/kg	34	U	ug/kg	Normal	None
11108	19930726	7.5	8.5	580.2	479873.665	1350027.391	Aroclor-1254	130	ug/kg	39	U	ug/kg	Normal	None
11108	19930725	9	10	580.2	479873.665	1350027.391	Aroclor-1254	130	ug/kg	39	U	ug/kg	Normal	None
11109	19930724	0	0.5	578.1	479750.119	1349623.424	Aroclor-1254	130	ug/kg	36	U	ug/kg	Normal	None
11109	19930724	0	0.5	578.1	479750.119	1349623.424	Aroclor-1254	130	ug/kg	35	U	ug/kg	Normal	None
11109	19930724	1	1.5	578.1	479750.119	1349623.424	Aroclor-1254	130	ug/kg	36	U	ug/kg	Normal	None
11109	19930724	2.5	3	578.1	479750.119	1349623.424	Aroclor-1254	130	ug/kg	41	U	ug/kg	Normal	None
11109	19930724	6	6.5	578.1	479750.119	1349623.424	Aroclor-1254	130	ug/kg	40	U	ug/kg	Normal	None
11109	19930724	9	9.5	578.1	479750.119	1349623.424	Aroclor-1254	130	ug/kg	42	U	ug/kg	Normal	None
11110	19930727	0	0.5	578.7	479770.742	1349911.203	Aroclor-1254	130	ug/kg	54	J	ug/kg	Normal	None
11110	19930727	1	1.5	578.7	479770.742	1349911.203	Aroclor-1254	130	ug/kg	38	U	ug/kg	Normal	None
11110	19930727	2.5	3	578.7	479770.742	1349911.203	Aroclor-1254	130	ug/kg	40	U	ug/kg	Normal	None
11110	19930727	6	7	578.7	479770.742	1349911.203	Aroclor-1254	130	ug/kg	38	U	ug/kg	Normal	None
11110	19930727	9	10	578.7	479770.742	1349911.203	Aroclor-1254	130	ug/kg	39	U	ug/kg	Normal	None
A5-CH-1	20010926	0	0.5		478863.05	1350182.24	Aroclor-1254	130	ug/kg	39	U	ug/kg	Normal	None
A5-CH-1	20010926	2	2.5		478863.05	1350182.24	Aroclor-1254	130	ug/kg	42	U	ug/kg	Normal	None
A5-CH-1	20010926	4	4.5		478863.05	1350182.24	Aroclor-1254	130	ug/kg	41	U	ug/kg	Normal	None
A5-CH-2	20010926	0	0.5		478862.33	1350204.62	Aroclor-1254	130	ug/kg	41	U	ug/kg	Normal	None
A5-CH-2	20010926	2	2.5		478862.33	1350204.62	Aroclor-1254	130	ug/kg	39	U	ug/kg	Normal	None
A5-CH-2	20010926	4	4.5		478862.33	1350204.62	Aroclor-1254	130	ug/kg	41	U	ug/kg	Normal	None
A5-CH-3	20010926	0	0.5		478844.46	1350204.5	Aroclor-1254	130	ug/kg	39	U	ug/kg	Normal	None
A5-CH-3	20010926	2	2.5		478844.46	1350204.5	Aroclor-1254	130	ug/kg	41	U	ug/kg	Normal	None
A5-CH-3	20010926	4	4.5		478844.46	1350204.5	Aroclor-1254	130	ug/kg	42	U	ug/kg	Normal	None
A5-CH-4	20010926	0	0.5		478845.11	1350181.52	Aroclor-1254	130	ug/kg	40	U	ug/kg	Normal	None
A5-CH-4	20010926	2	2.5		478845.11	1350181.52	Aroclor-1254	130	ug/kg	41	U	ug/kg	Normal	None
A5-CH-4	20010926	4	4.5		478845.11	1350181.52	Aroclor-1254	130	ug/kg	42	U	ug/kg	Normal	None
ESA-1	19930126	0	0.5	577.7	479890.3353	1350352.335	Aroclor-1254	130	ug/kg	190	U	ug/kg	Normal	None
ESA-10	19920129	0	0.5	575.4	479785.12	1350506.711	Aroclor-1254	130	ug/kg	200	J	ug/kg	Normal	None
ESA-2	19930127	0	0.5	577.6	479884.269	1350352.05	Aroclor-1254	130	ug/kg	190	UJ	ug/kg	Normal	None
ESA-3	19930127	0	0.5	577.5	479878.389	1350351.59	Aroclor-1254	130	ug/kg	190	U	ug/kg	Normal	None
ESA-4	19930127	0	0.5	577.6	479846.489	1350350.701	Aroclor-1254	130	ug/kg	190	U	ug/kg	Normal	None
ESA-5	19930127	0	0.5	577.6	479840.508	1350350.501	Aroclor-1254	130	ug/kg	190	U	ug/kg	Normal	None
ESA-6	19920127	0	0.5	577.5	479834.418	1350350.511	Aroclor-1254	130	ug/kg	190	UJ	ug/kg	Normal	None
ESA-7	19920127	0	0.5	577.7	479767.898	1350348.681	Aroclor-1254	130	ug/kg	210	UJ	ug/kg	Normal	None
ESA-8	19930128	0	0.5	577.7	479762.478	1350348.582	Aroclor-1254	130	ug/kg	200	UJ	ug/kg	Normal	None
ESA-9	19920128	0	0.5	577.7	479757.118	1350348.372	Aroclor-1254	130	ug/kg	200	UJ	ug/kg	Normal	None
PUMP1-C-10-MP	19970309	0	0.33		479499	1350598	Aroclor-1254	130	ug/kg	37	U	ug/kg	Normal	None
PUMP1-C-11-MP	19970309	0	0.33		479516	1350616	Aroclor-1254	130	ug/kg	40	U	ug/kg	Duplicate	None
PUMP1-C-11-MP	19970309	0	0.33		479516	1350616	Aroclor-1254	130	ug/kg	38	U	ug/kg	Normal	None

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**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
PUMP1-C-12-MP	19970309	0	0.33		479511	1350630	Aroclor-1254	130	ug/kg	39	U	ug/kg	Normal	None
PUMP1-C-13-MP	19970309	0	0.33		479538	1350583	Aroclor-1254	130	ug/kg	38	U	ug/kg	Normal	None
PUMP1-C-14-MP	19970309	0	0.33		479541	1350596	Aroclor-1254	130	ug/kg	39	U	ug/kg	Normal	None
PUMP1-C-15-MP	19970309	0	0.33		479520	1350607	Aroclor-1254	130	ug/kg	40	U	ug/kg	Normal	None
PUMP1-C-16-MP	19970309	0	0.33		479541	1350624	Aroclor-1254	130	ug/kg	37	U	ug/kg	Normal	None
PUMP1-C-1-MP	19970307	0	0.33		479461	1350576	Aroclor-1254	130	ug/kg	43	U	ug/kg	Normal	None
PUMP1-C-2-MP	19970307	0	0.33		479452	1350600	Aroclor-1254	130	ug/kg	38	U	ug/kg	Normal	None
PUMP1-C-3-MP	19970307	0	0.33		479460	1350617	Aroclor-1254	130	ug/kg	40	UJ	ug/kg	Normal	None
PUMP1-C-3-MP	19970307	0	0.33		479460	1350617	Aroclor-1254	130	ug/kg	40	Z	ug/kg	Normal	None
PUMP1-C-4-MP	19970307	0	0.33		479451	1350629	Aroclor-1254	130	ug/kg	42	U	ug/kg	Normal	None
PUMP1-C-5-MP	19970307	0	0.33		479475	1350576	Aroclor-1254	130	ug/kg	44	U	ug/kg	Normal	None
PUMP1-C-6-MP	19970307	0	0.33		479480	1350600	Aroclor-1254	130	ug/kg	40	U	ug/kg	Normal	None
PUMP1-C-7-MP	19970309	0	0.33		479484	1350617	Aroclor-1254	130	ug/kg	39	U	ug/kg	Normal	None
PUMP1-C-8-MP	19970309	0	0.33		479486	1350640	Aroclor-1254	130	ug/kg	38	U	ug/kg	Normal	None
PUMP1-C-9-MP	19970309	0	0.33		479503	1350581	Aroclor-1254	130	ug/kg	39	U	ug/kg	Normal	None
11108	19930724	0	0.5	580.2	479873.665	1350027.391	Aroclor-1260	130	ug/kg	39	U	ug/kg	Normal	None
11108	19930724	1	1.5	580.2	479873.665	1350027.391	Aroclor-1260	130	ug/kg	38	U	ug/kg	Normal	None
11108	19930724	2.5	3	580.2	479873.665	1350027.391	Aroclor-1260	130	ug/kg	34	U	ug/kg	Normal	None
11108	19930726	7.5	8.5	580.2	479873.665	1350027.391	Aroclor-1260	130	ug/kg	39	U	ug/kg	Normal	None
11108	19930725	9	10	580.2	479873.665	1350027.391	Aroclor-1260	130	ug/kg	39	U	ug/kg	Normal	None
11109	19930724	0	0.5	578.1	479750.119	1349623.424	Aroclor-1260	130	ug/kg	36	U	ug/kg	Normal	None
11109	19930724	0	0.5	578.1	479750.119	1349623.424	Aroclor-1260	130	ug/kg	35	U	ug/kg	Normal	None
11109	19930724	1	1.5	578.1	479750.119	1349623.424	Aroclor-1260	130	ug/kg	36	U	ug/kg	Normal	None
11109	19930724	2.5	3	578.1	479750.119	1349623.424	Aroclor-1260	130	ug/kg	41	U	ug/kg	Normal	None
11109	19930724	6	6.5	578.1	479750.119	1349623.424	Aroclor-1260	130	ug/kg	40	U	ug/kg	Normal	None
11109	19930724	9	9.5	578.1	479750.119	1349623.424	Aroclor-1260	130	ug/kg	42	U	ug/kg	Normal	None
11110	19930727	0	0.5	578.7	479770.742	1349911.203	Aroclor-1260	130	ug/kg	38	U	ug/kg	Normal	None
11110	19930727	1	1.5	578.7	479770.742	1349911.203	Aroclor-1260	130	ug/kg	38	U	ug/kg	Normal	None
11110	19930727	2.5	3	578.7	479770.742	1349911.203	Aroclor-1260	130	ug/kg	40	U	ug/kg	Normal	None
11110	19930727	6	7	578.7	479770.742	1349911.203	Aroclor-1260	130	ug/kg	38	U	ug/kg	Normal	None
11110	19930727	9	10	578.7	479770.742	1349911.203	Aroclor-1260	130	ug/kg	39	U	ug/kg	Normal	None
A5-CH-1	20010926	0	0.5		478863.05	1350182.24	Aroclor-1260	130	ug/kg	39	U	ug/kg	Normal	None
A5-CH-1	20010926	2	2.5		478863.05	1350182.24	Aroclor-1260	130	ug/kg	42	U	ug/kg	Normal	None
A5-CH-1	20010926	4	4.5		478863.05	1350182.24	Aroclor-1260	130	ug/kg	41	U	ug/kg	Normal	None
A5-CH-2	20010926	0	0.5		478862.33	1350204.62	Aroclor-1260	130	ug/kg	41	U	ug/kg	Normal	None
A5-CH-2	20010926	2	2.5		478862.33	1350204.62	Aroclor-1260	130	ug/kg	39	U	ug/kg	Normal	None
A5-CH-2	20010926	4	4.5		478862.33	1350204.62	Aroclor-1260	130	ug/kg	41	U	ug/kg	Normal	None
A5-CH-3	20010926	0	0.5		478844.46	1350204.5	Aroclor-1260	130	ug/kg	39	U	ug/kg	Normal	None
A5-CH-3	20010926	2	2.5		478844.46	1350204.5	Aroclor-1260	130	ug/kg	41	U	ug/kg	Normal	None
A5-CH-3	20010926	4	4.5		478844.46	1350204.5	Aroclor-1260	130	ug/kg	42	U	ug/kg	Normal	None
A5-CH-4	20010926	0	0.5		478845.11	1350181.52	Aroclor-1260	130	ug/kg	40	U	ug/kg	Normal	None

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**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
A5-CH-4	20010926	2	2.5		478845.11	1350181.52	Aroclor-1260	130	ug/kg	41	U	ug/kg	Normal	None
A5-CH-4	20010926	4	4.5		478845.11	1350181.52	Aroclor-1260	130	ug/kg	42	U	ug/kg	Normal	None
ESA-1	19930126	0	0.5	577.7	479890.3353	1350352.335	Aroclor-1260	130	ug/kg	190	U	ug/kg	Normal	None
ESA-10	19920129	0	0.5	575.4	479785.12	1350506.711	Aroclor-1260	130	ug/kg	250	UJ	ug/kg	Normal	None
ESA-2	19930127	0	0.5	577.6	479884.269	1350352.05	Aroclor-1260	130	ug/kg	190	UJ	ug/kg	Normal	None
ESA-3	19930127	0	0.5	577.5	479878.389	1350351.59	Aroclor-1260	130	ug/kg	190	U	ug/kg	Normal	None
ESA-4	19930127	0	0.5	577.6	479846.489	1350350.701	Aroclor-1260	130	ug/kg	190	U	ug/kg	Normal	None
ESA-5	19930127	0	0.5	577.6	479840.508	1350350.501	Aroclor-1260	130	ug/kg	190	U	ug/kg	Normal	None
ESA-6	19920127	0	0.5	577.5	479834.418	1350350.511	Aroclor-1260	130	ug/kg	190	UJ	ug/kg	Normal	None
ESA-7	19920127	0	0.5	577.7	479767.898	1350348.681	Aroclor-1260	130	ug/kg	210	UJ	ug/kg	Normal	None
ESA-8	19930128	0	0.5	577.7	479762.478	1350348.582	Aroclor-1260	130	ug/kg	200	UJ	ug/kg	Normal	None
ESA-9	19920128	0	0.5	577.7	479757.118	1350348.372	Aroclor-1260	130	ug/kg	200	UJ	ug/kg	Normal	None
PUMP1-C-10-MP	19970309	0	0.33		479499	1350598	Aroclor-1260	130	ug/kg	37	U	ug/kg	Normal	None
PUMP1-C-11-MP	19970309	0	0.33		479516	1350616	Aroclor-1260	130	ug/kg	40	U	ug/kg	Duplicate	None
PUMP1-C-11-MP	19970309	0	0.33		479516	1350616	Aroclor-1260	130	ug/kg	38	U	ug/kg	Normal	None
PUMP1-C-12-MP	19970309	0	0.33		479511	1350630	Aroclor-1260	130	ug/kg	39	U	ug/kg	Normal	None
PUMP1-C-13-MP	19970309	0	0.33		479538	1350583	Aroclor-1260	130	ug/kg	38	U	ug/kg	Normal	None
PUMP1-C-14-MP	19970309	0	0.33		479541	1350596	Aroclor-1260	130	ug/kg	39	U	ug/kg	Normal	None
PUMP1-C-15-MP	19970309	0	0.33		479520	1350607	Aroclor-1260	130	ug/kg	40	U	ug/kg	Normal	None
PUMP1-C-16-MP	19970309	0	0.33		479541	1350624	Aroclor-1260	130	ug/kg	37	U	ug/kg	Normal	None
PUMP1-C-1-MP	19970307	0	0.33		479461	1350576	Aroclor-1260	130	ug/kg	43	U	ug/kg	Normal	None
PUMP1-C-2-MP	19970307	0	0.33		479452	1350600	Aroclor-1260	130	ug/kg	38	U	ug/kg	Normal	None
PUMP1-C-3-MP	19970307	0	0.33		479460	1350617	Aroclor-1260	130	ug/kg	40	UJ	ug/kg	Normal	None
PUMP1-C-3-MP	19970307	0	0.33		479460	1350617	Aroclor-1260	130	ug/kg	40	Z	ug/kg	Normal	None
PUMP1-C-4-MP	19970307	0	0.33		479451	1350629	Aroclor-1260	130	ug/kg	42	U	ug/kg	Normal	None
PUMP1-C-5-MP	19970307	0	0.33		479475	1350576	Aroclor-1260	130	ug/kg	44	U	ug/kg	Normal	None
PUMP1-C-6-MP	19970307	0	0.33		479480	1350600	Aroclor-1260	130	ug/kg	40	U	ug/kg	Normal	None
PUMP1-C-7-MP	19970309	0	0.33		479484	1350617	Aroclor-1260	130	ug/kg	39	U	ug/kg	Normal	None
PUMP1-C-8-MP	19970309	0	0.33		479486	1350640	Aroclor-1260	130	ug/kg	38	U	ug/kg	Normal	None
PUMP1-C-9-MP	19970309	0	0.33		479503	1350581	Aroclor-1260	130	ug/kg	39	U	ug/kg	Normal	None
PUMP-C-10-MP	19970121	0.5	0.83		479520.06	1350590.02	Aroclor-1260	130	ug/kg	48	UJ	ug/kg	Normal	None
PUMP-C-14-MP	19970121	0.5	0.83		479536.09	1350592.02	Aroclor-1260	130	ug/kg	48	UJ	ug/kg	Normal	None
PUMP-C-15-MP	19970121	0.5	0.83		479522.17	1350611.17	Aroclor-1260	130	ug/kg	49	UJ	ug/kg	Normal	None
PUMP-C-2-MP	19970121	0.5	0.83		479449.2	1350588.36	Aroclor-1260	130	ug/kg	48	UJ	ug/kg	Normal	None
PUMP-C-4-MP	19970121	0.5	0.83		479467.03	1350637.17	Aroclor-1260	130	ug/kg	48	UJ	ug/kg	Normal	None
PUMP-C-5-MP	19970121	0.5	0.83		479478	1350577.08	Aroclor-1260	130	ug/kg	50	UJ	ug/kg	Normal	None
PUMP-C-6-MP	19970121	0.5	0.83		479484.1	1350602.14	Aroclor-1260	130	ug/kg	49	UJ	ug/kg	Normal	None
PUMP-C-8-MP	19970121	0.5	0.83		479474.03	1350633.35	Aroclor-1260	130	ug/kg	48	UJ	ug/kg	Normal	None
PUMP-C-9-MP	19970121	0.5	0.83		479508.16	1350580.14	Aroclor-1260	130	ug/kg	47	UJ	ug/kg	Normal	None
11108	19930724	0	0.5	580.2	479873.665	1350027.391	Arsenic	12	mg/kg	11.6	J	mg/kg	Normal	None
11108	19930724	1	1.5	580.2	479873.665	1350027.391	Arsenic	12	mg/kg	5	J	mg/kg	Normal	None

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APPENDIX A
AREA 5 HISTORICAL ASCOC DATA

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Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
11108	19930724	2.5	3	580.2	479873.665	1350027.391	Arsenic	12	mg/kg	3.7	J	mg/kg	Normal	None
11108	19930726	7.5	8.5	580.2	479873.665	1350027.391	Arsenic	12	mg/kg	5.3	J	mg/kg	Normal	None
11108	19930725	9	10	580.2	479873.665	1350027.391	Arsenic	12	mg/kg	6.7	J	mg/kg	Normal	None
11109	19930724	0	0.5	578.1	479750.119	1349623.424	Arsenic	12	mg/kg	6.4	J	mg/kg	Normal	None
11109	19930724	0	0.5	578.1	479750.119	1349623.424	Arsenic	12	mg/kg	3.4	J	mg/kg	Normal	None
11109	19930724	1	1.5	578.1	479750.119	1349623.424	Arsenic	12	mg/kg	4.8	J	mg/kg	Normal	None
11109	19930724	2.5	3	578.1	479750.119	1349623.424	Arsenic	12	mg/kg	5.1	J	mg/kg	Normal	None
11109	19930724	6	6.5	578.1	479750.119	1349623.424	Arsenic	12	mg/kg	5.2	J	mg/kg	Normal	None
11109	19930724	9	9.5	578.1	479750.119	1349623.424	Arsenic	12	mg/kg	4.4	J	mg/kg	Normal	None
11110	19930727	0	0.5	578.7	479770.742	1349911.203	Arsenic	12	mg/kg	8	J	mg/kg	Normal	None
11110	19930727	1	1.5	578.7	479770.742	1349911.203	Arsenic	12	mg/kg	7.8	J	mg/kg	Normal	None
11110	19930727	2.5	3	578.7	479770.742	1349911.203	Arsenic	12	mg/kg	16.3	J	mg/kg	Normal	None
11110	19930727	6	7	578.7	479770.742	1349911.203	Arsenic	12	mg/kg	6.9	J	mg/kg	Normal	None
11110	19930727	9	10	578.7	479770.742	1349911.203	Arsenic	12	mg/kg	7.2	J	mg/kg	Normal	None
A5-CH-1	20010906	0	0.5		478863.05	1350182.24	Arsenic	12	mg/kg	5.39	-	mg/kg	Normal	None
A5-CH-1	20010906	2	2.5		478863.05	1350182.24	Arsenic	12	mg/kg	6.13	-	mg/kg	Normal	None
A5-CH-1	20010906	4	4.5		478863.05	1350182.24	Arsenic	12	mg/kg	9.34	J	mg/kg	Normal	None
A5-CH-2	20010906	0	0.5		478862.33	1350204.62	Arsenic	12	mg/kg	6.19	-	mg/kg	Normal	None
A5-CH-2	20010906	2	2.5		478862.33	1350204.62	Arsenic	12	mg/kg	5.19	-	mg/kg	Normal	None
A5-CH-2	20010906	4	4.5		478862.33	1350204.62	Arsenic	12	mg/kg	9.73	J	mg/kg	Normal	None
A5-CH-3	20010906	0	0.5		478844.46	1350204.5	Arsenic	12	mg/kg	5.69	-	mg/kg	Normal	None
A5-CH-3	20010906	2	2.5		478844.46	1350204.5	Arsenic	12	mg/kg	8.65	J	mg/kg	Normal	None
A5-CH-3	20010906	4	4.5		478844.46	1350204.5	Arsenic	12	mg/kg	12.3	-	mg/kg	Normal	None
A5-CH-4	20010906	0	0.5		478845.11	1350181.52	Arsenic	12	mg/kg	6.05	J	mg/kg	Normal	None
A5-CH-4	20010906	2	2.5		478845.11	1350181.52	Arsenic	12	mg/kg	10.1	J	mg/kg	Normal	None
A5-CH-4	20010906	4	4.5		478845.11	1350181.52	Arsenic	12	mg/kg	10.7	J	mg/kg	Normal	None
P29-15					479831.2	1350179.79	Arsenic	12	mg/kg	0.03	UNV	mg/kg		None
P29-21					479952.04	1350185.21	Arsenic	12	mg/kg	0.03	UNV	mg/kg		None
P29-22					479966.8	1350184.76	Arsenic	12	mg/kg	0.03	UNV	mg/kg		None
P29-8					479662.87	1350169.64	Arsenic	12	mg/kg	0.03	UNV	mg/kg		None
P29-9					479690.63	1350170.37	Arsenic	12	mg/kg	0.03	UNV	mg/kg		None
P5-11	19930624	0	0.5		479775.44	1350388.33	Arsenic	12	mg/kg	4.9	NV	mg/kg		None
P5-11	19930624	0	1		479775.44	1350388.33	Arsenic	12	mg/kg	7.6	NV	mg/kg		None
P5-11	19930624	0	3		479775.44	1350388.33	Arsenic	12	mg/kg	5.4	NV	mg/kg		None
P5-12	19930624	0	0.5		479738.78	1350387.27	Arsenic	12	mg/kg	4.7	NV	mg/kg		None
P5-12	19930624	0	1		479738.78	1350387.27	Arsenic	12	mg/kg	5.2	NV	mg/kg		None
P5-12	19930624	0	3		479738.78	1350387.27	Arsenic	12	mg/kg	4.6	NV	mg/kg		None
P5-13	19930629	0	0.5		479905.88	1350275.77	Arsenic	12	mg/kg	6.8	NV	mg/kg		None
P5-13	19930629	0	1		479905.88	1350275.77	Arsenic	12	mg/kg	6.3	NV	mg/kg		None
P5-13	19930629	0	3		479905.88	1350275.77	Arsenic	12	mg/kg	9.4	NV	mg/kg		None
P5-14	19930629	0	0.5		479906.76	1350303.31	Arsenic	12	mg/kg	5.6	NV	mg/kg		None

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**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
P5-14	19930629	0	0.5		479906.76	1350303.31	Arsenic	12	mg/kg	2	UNV	mg/kg		None
P5-15	19930629	0	0.5		479906.76	1350334	Arsenic	12	mg/kg	2	UNV	mg/kg		None
P5-15	19930629	0	1		479906.76	1350334	Arsenic	12	mg/kg	7.7	NV	mg/kg		None
P5-15	19930629	0	1		479906.76	1350334	Arsenic	12	mg/kg	7	NV	mg/kg		None
P5-16	19930629	0	0.5		479883.26	1350270.45	Arsenic	12	mg/kg	6.4	NV	mg/kg		None
P5-16	19930629	0	1		479883.26	1350270.45	Arsenic	12	mg/kg	4.5	NV	mg/kg		None
P5-16	19930629	0	3		479883.26	1350270.45	Arsenic	12	mg/kg	5.6	NV	mg/kg		None
P5-17	19930629	0	0.5		479883.26	1350300.16	Arsenic	12	mg/kg	3.4	NV	mg/kg		None
P5-17	19930629	0	1		479883.26	1350300.16	Arsenic	12	mg/kg	7.1	NV	mg/kg		None
P5-17	19930629	0	3		479883.26	1350300.16	Arsenic	12	mg/kg	5.6	NV	mg/kg		None
P5-18	19930628	0	0.5		479883.26	1350327.25	Arsenic	12	mg/kg	2.7	NV	mg/kg		None
P5-18	19930628	0	1		479883.26	1350327.25	Arsenic	12	mg/kg	3.7	NV	mg/kg		None
P5-18	19930628	0	3		479883.26	1350327.25	Arsenic	12	mg/kg	4.7	NV	mg/kg		None
P5-19	19930628	0	0.5		479857.02	1350272.71	Arsenic	12	mg/kg	8.1	NV	mg/kg		None
P5-19	19930628	0	1		479857.02	1350272.71	Arsenic	12	mg/kg	14.9	NV	mg/kg		None
P5-19	19930628	0	3		479857.02	1350272.71	Arsenic	12	mg/kg	9.3	NV	mg/kg		None
P5-20	19930624	0	0.5		479843.9	1350285.62	Arsenic	12	mg/kg	6.9	NV	mg/kg		None
P5-20	19930624	0	1		479843.9	1350285.62	Arsenic	12	mg/kg	6.3	NV	mg/kg		None
P5-20	19930629	0	1		479843.9	1350285.62	Arsenic	12	mg/kg	5.9	NV	mg/kg		None
P5-20	19930629	0	3		479843.9	1350285.62	Arsenic	12	mg/kg	10	NV	mg/kg		None
P5-21	19930624	0	0.5		479843.9	1350324.43	Arsenic	12	mg/kg	5.8	NV	mg/kg		None
P5-21	19940624	0	1		479843.9	1350324.43	Arsenic	12	mg/kg	4.2	NV	mg/kg		None
P5-21	19930624	0	3		479843.9	1350324.43	Arsenic	12	mg/kg	5.2	NV	mg/kg		None
P5-7	19930623	0	3		479851.43	1350390.02	Arsenic	12	mg/kg	5.4	NV	mg/kg		None
P5-8	19930623	0	3		479803.11	1350390.4	Arsenic	12	mg/kg	6.8	NV	mg/kg		None
PUMP1-C-10-MP	19970309	0	0.33		479499	1350598	Arsenic	12	mg/kg	9.3	-	mg/kg	Normal	None
PUMP1-C-11-MP	19970309	0	0.33		479516	1350616	Arsenic	12	mg/kg	9.9	-	mg/kg	Duplicate	None
PUMP1-C-11-MP	19970309	0	0.33		479516	1350616	Arsenic	12	mg/kg	9.2	-	mg/kg	Normal	None
PUMP1-C-12-MP	19970309	0	0.33		479511	1350630	Arsenic	12	mg/kg	8.2	-	mg/kg	Normal	None
PUMP1-C-13-MP	19970309	0	0.33		479538	1350583	Arsenic	12	mg/kg	7.2	-	mg/kg	Normal	None
PUMP1-C-14-MP	19970309	0	0.33		479541	1350596	Arsenic	12	mg/kg	12.6	-	mg/kg	Normal	None
PUMP1-C-15-MP	19970309	0	0.33		479520	1350607	Arsenic	12	mg/kg	7.9	-	mg/kg	Normal	None
PUMP1-C-16-MP	19970309	0	0.33		479541	1350624	Arsenic	12	mg/kg	8.5	-	mg/kg	Normal	None
PUMP1-C-1-MP	19970307	0	0.33		479461	1350576	Arsenic	12	mg/kg	8	-	mg/kg	Normal	None
PUMP1-C-2-MP	19970307	0	0.33		479452	1350600	Arsenic	12	mg/kg	9.1	-	mg/kg	Normal	None
PUMP1-C-3-MP	19970307	0	0.33		479460	1350617	Arsenic	12	mg/kg	8.5	-	mg/kg	Normal	None
PUMP1-C-4-MP	19970307	0	0.33		479451	1350629	Arsenic	12	mg/kg	10.7	-	mg/kg	Normal	None
PUMP1-C-5-MP	19970307	0	0.33		479475	1350576	Arsenic	12	mg/kg	8	-	mg/kg	Normal	None
PUMP1-C-6-MP	19970307	0	0.33		479480	1350600	Arsenic	12	mg/kg	8.6	-	mg/kg	Normal	None
PUMP1-C-7-MP	19970309	0	0.33		479484	1350617	Arsenic	12	mg/kg	8.2	-	mg/kg	Normal	None
PUMP1-C-8-MP	19970309	0	0.33		479486	1350640	Arsenic	12	mg/kg	10	-	mg/kg	Normal	None

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**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

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Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
PUMP1-C-9-MP	19970309	0	0.33		479503	1350581	Arsenic	12	mg/kg	10.2	-	mg/kg	Normal	None
PUMP-C-10-MP	19970121	0.5	0.83		479520.06	1350590.02	Arsenic	12	mg/kg	5.3	-	mg/kg	Normal	None
PUMP-C-14-MP	19970121	0.5	0.83		479536.09	1350592.02	Arsenic	12	mg/kg	7.8	-	mg/kg	Normal	None
PUMP-C-15-MP	19970121	0.5	0.83		479522.17	1350611.17	Arsenic	12	mg/kg	9.3	-	mg/kg	Normal	None
PUMP-C-2-MP	19970121	0.5	0.83		479449.2	1350588.36	Arsenic	12	mg/kg	7.9	-	mg/kg	Normal	None
PUMP-C-4-MP	19970121	0.5	0.83		479467.03	1350637.17	Arsenic	12	mg/kg	9.1	-	mg/kg	Normal	None
PUMP-C-5-MP	19970121	0.5	0.83		479478	1350577.08	Arsenic	12	mg/kg	8.9	-	mg/kg	Normal	None
PUMP-C-6-MP	19970121	0.5	0.83		479484.1	1350602.14	Arsenic	12	mg/kg	9.3	-	mg/kg	Normal	None
PUMP-C-8-MP	19970121	0.5	0.83		479474.03	1350633.35	Arsenic	12	mg/kg	7.5	-	mg/kg	Normal	None
PUMP-C-9-MP	19970121	0.5	0.83		479508.16	1350580.14	Arsenic	12	mg/kg	8.2	-	mg/kg	Normal	None
USSO-041890-1	19900418	-99	-99		479862.396	1350125.991	Arsenic	12	mg/kg	12.9	NV	mg/kg	Normal	None
USSO-041890-3	19900418	-99	-99		479862.396	1350125.991	Arsenic	12	mg/kg	5.41	NV	mg/kg	Normal	None
USSO-041890-3	19900418	-99	-99		479862.396	1350125.991	Arsenic	12	mg/kg	5.27	NV	mg/kg	Normal	None
USSO-041890-4	19900418	-99	-99		479862.396	1350125.991	Arsenic	12	mg/kg	6.18	NV	mg/kg	Normal	None
USSO-041890-5	19900418	-99	-99		479862.396	1350125.991	Arsenic	12	mg/kg	6.54	NV	mg/kg	Normal	None
USSO-041890-6	19900418	-99	-99		479862.396	1350125.991	Arsenic	12	mg/kg	20.1	NV	mg/kg	Normal	None
11108	19930724	0	0.5	580.2	479873.665	1350027.391	Beryllium	1.5	mg/kg	0.95	U	mg/kg	Normal	None
11108	19930724	1	1.5	580.2	479873.665	1350027.391	Beryllium	1.5	mg/kg	0.91	U	mg/kg	Normal	None
11108	19930724	2.5	3	580.2	479873.665	1350027.391	Beryllium	1.5	mg/kg	1.2	-	mg/kg	Normal	None
11108	19930726	7.5	8.5	580.2	479873.665	1350027.391	Beryllium	1.5	mg/kg	0.95	UJ	mg/kg	Normal	None
11108	19930725	9	10	580.2	479873.665	1350027.391	Beryllium	1.5	mg/kg	0.95	U	mg/kg	Normal	None
11109	19930724	0	0.5	578.1	479750.119	1349623.424	Beryllium	1.5	mg/kg	0.88	U	mg/kg	Normal	None
11109	19930724	0	0.5	578.1	479750.119	1349623.424	Beryllium	1.5	mg/kg	0.86	U	mg/kg	Normal	None
11109	19930724	1	1.5	578.1	479750.119	1349623.424	Beryllium	1.5	mg/kg	1.8	-	mg/kg	Normal	None
11109	19930724	2.5	3	578.1	479750.119	1349623.424	Beryllium	1.5	mg/kg	0.99	U	mg/kg	Normal	None
11109	19930724	6	6.5	578.1	479750.119	1349623.424	Beryllium	1.5	mg/kg	0.97	U	mg/kg	Normal	None
11109	19930724	9	9.5	578.1	479750.119	1349623.424	Beryllium	1.5	mg/kg	1	U	mg/kg	Normal	None
11110	19930727	0	0.5	578.7	479770.742	1349911.203	Beryllium	1.5	mg/kg	1.1	J	mg/kg	Normal	None
11110	19930727	1	1.5	578.7	479770.742	1349911.203	Beryllium	1.5	mg/kg	0.93	UJ	mg/kg	Normal	None
11110	19930727	2.5	3	578.7	479770.742	1349911.203	Beryllium	1.5	mg/kg	1.5	J	mg/kg	Normal	None
11110	19930727	6	7	578.7	479770.742	1349911.203	Beryllium	1.5	mg/kg	1.7	J	mg/kg	Normal	None
11110	19930727	9	10	578.7	479770.742	1349911.203	Beryllium	1.5	mg/kg	0.95	UJ	mg/kg	Normal	None
A5-CH-1	20010906	0	0.5		478863.05	1350182.24	Beryllium	1.5	mg/kg	0.57	-	mg/kg	Normal	None
A5-CH-1	20010906	2	2.5		478863.05	1350182.24	Beryllium	1.5	mg/kg	0.88	-	mg/kg	Normal	None
A5-CH-1	20010906	4	4.5		478863.05	1350182.24	Beryllium	1.5	mg/kg	0.2	-	mg/kg	Normal	None
A5-CH-2	20010906	0	0.5		478862.33	1350204.62	Beryllium	1.5	mg/kg	0.46	-	mg/kg	Normal	None
A5-CH-2	20010906	2	2.5		478862.33	1350204.62	Beryllium	1.5	mg/kg	0.57	-	mg/kg	Normal	None
A5-CH-2	20010906	4	4.5		478862.33	1350204.62	Beryllium	1.5	mg/kg	0.55	-	mg/kg	Normal	None
A5-CH-3	20010906	0	0.5		478844.46	1350204.5	Beryllium	1.5	mg/kg	0.4	-	mg/kg	Normal	None
A5-CH-3	20010906	2	2.5		478844.46	1350204.5	Beryllium	1.5	mg/kg	0.9	-	mg/kg	Normal	None
A5-CH-3	20010906	4	4.5		478844.46	1350204.5	Beryllium	1.5	mg/kg	0.49	-	mg/kg	Normal	None

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**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
A5-CH-4	20010906	0	0.5		478845.11	1350181.52	Beryllium	1.5	mg/kg	0.58	-	mg/kg	Normal	None
A5-CH-4	20010906	2	2.5		478845.11	1350181.52	Beryllium	1.5	mg/kg	0.91	-	mg/kg	Normal	None
A5-CH-4	20010906	4	4.5		478845.11	1350181.52	Beryllium	1.5	mg/kg	0.57	-	mg/kg	Normal	None
ESA-1	19930126	0	0.5	577.7	479890.3353	1350352.335	Beryllium	1.5	mg/kg	0.39	U	mg/kg	Normal	None
ESA-10	19920129	0	0.5	575.4	479785.12	1350506.711	Beryllium	1.5	mg/kg	0.52	U	mg/kg	Normal	None
ESA-2	19930127	0	0.5	577.6	479884.269	1350352.05	Beryllium	1.5	mg/kg	0.45	U	mg/kg	Normal	None
ESA-3	19930127	0	0.5	577.5	479878.389	1350351.59	Beryllium	1.5	mg/kg	0.43	U	mg/kg	Normal	None
ESA-4	19930127	0	0.5	577.6	479846.489	1350350.701	Beryllium	1.5	mg/kg	0.38	-	mg/kg	Normal	None
ESA-5	19930127	0	0.5	577.6	479840.508	1350350.501	Beryllium	1.5	mg/kg	0.42	-	mg/kg	Normal	None
ESA-6	19920127	0	0.5	577.5	479834.418	1350350.511	Beryllium	1.5	mg/kg	0.34	U	mg/kg	Normal	None
ESA-7	19920127	0	0.5	577.7	479767.898	1350348.681	Beryllium	1.5	mg/kg	0.43	-	mg/kg	Normal	None
ESA-8	19930128	0	0.5	577.7	479762.478	1350348.582	Beryllium	1.5	mg/kg	0.8	-	mg/kg	Normal	None
ESA-9	19920128	0	0.5	577.7	479757.118	1350348.372	Beryllium	1.5	mg/kg	0.61	-	mg/kg	Normal	None
PUMP1-C-10-MP	19970309	0	0.33		479499	1350598	Beryllium	1.5	mg/kg	0.92	U	mg/kg	Normal	None
PUMP1-C-11-MP	19970309	0	0.33		479516	1350616	Beryllium	1.5	mg/kg	1	U	mg/kg	Duplicate	None
PUMP1-C-11-MP	19970309	0	0.33		479516	1350616	Beryllium	1.5	mg/kg	0.92	U	mg/kg	Normal	None
PUMP1-C-12-MP	19970309	0	0.33		479511	1350630	Beryllium	1.5	mg/kg	0.86	U	mg/kg	Normal	None
PUMP1-C-13-MP	19970309	0	0.33		479538	1350583	Beryllium	1.5	mg/kg	0.75	U	mg/kg	Normal	None
PUMP1-C-14-MP	19970309	0	0.33		479541	1350596	Beryllium	1.5	mg/kg	1.1	U	mg/kg	Normal	None
PUMP1-C-15-MP	19970309	0	0.33		479520	1350607	Beryllium	1.5	mg/kg	0.76	U	mg/kg	Normal	None
PUMP1-C-16-MP	19970309	0	0.33		479541	1350624	Beryllium	1.5	mg/kg	0.95	U	mg/kg	Normal	None
PUMP1-C-1-MP	19970307	0	0.33		479461	1350576	Beryllium	1.5	mg/kg	1.4	U	mg/kg	Normal	None
PUMP1-C-2-MP	19970307	0	0.33		479452	1350600	Beryllium	1.5	mg/kg	0.93	U	mg/kg	Normal	None
PUMP1-C-3-MP	19970307	0	0.33		479460	1350617	Beryllium	1.5	mg/kg	0.9	U	mg/kg	Normal	None
PUMP1-C-4-MP	19970307	0	0.33		479451	1350629	Beryllium	1.5	mg/kg	1.1	U	mg/kg	Normal	None
PUMP1-C-5-MP	19970307	0	0.33		479475	1350576	Beryllium	1.5	mg/kg	1.5	U	mg/kg	Normal	None
PUMP1-C-6-MP	19970307	0	0.33		479480	1350600	Beryllium	1.5	mg/kg	1.1	U	mg/kg	Normal	None
PUMP1-C-7-MP	19970309	0	0.33		479484	1350617	Beryllium	1.5	mg/kg	0.9	U	mg/kg	Normal	None
PUMP1-C-8-MP	19970309	0	0.33		479486	1350640	Beryllium	1.5	mg/kg	1	U	mg/kg	Normal	None
PUMP1-C-9-MP	19970309	0	0.33		479503	1350581	Beryllium	1.5	mg/kg	1.2	U	mg/kg	Normal	None
PUMP-C-10-MP	19970121	0.5	0.83		479520.06	1350590.02	Beryllium	1.5	mg/kg	0.4	U	mg/kg	Normal	None
PUMP-C-14-MP	19970121	0.5	0.83		479536.09	1350592.02	Beryllium	1.5	mg/kg	0.69	U	mg/kg	Normal	None
PUMP-C-15-MP	19970121	0.5	0.83		479522.17	1350611.17	Beryllium	1.5	mg/kg	0.82	U	mg/kg	Normal	None
PUMP-C-2-MP	19970121	0.5	0.83		479449.2	1350588.36	Beryllium	1.5	mg/kg	0.97	-	mg/kg	Normal	None
PUMP-C-4-MP	19970121	0.5	0.83		479467.03	1350637.17	Beryllium	1.5	mg/kg	0.79	U	mg/kg	Normal	None
PUMP-C-5-MP	19970121	0.5	0.83		479478	1350577.08	Beryllium	1.5	mg/kg	1.2	-	mg/kg	Normal	None
PUMP-C-6-MP	19970121	0.5	0.83		479484.1	1350602.14	Beryllium	1.5	mg/kg	0.84	U	mg/kg	Normal	None
PUMP-C-8-MP	19970121	0.5	0.83		479474.03	1350633.35	Beryllium	1.5	mg/kg	0.9	U	mg/kg	Normal	None
PUMP-C-9-MP	19970121	0.5	0.83		479508.16	1350580.14	Beryllium	1.5	mg/kg	0.63	U	mg/kg	Normal	None
11108	19930724	0	0.5	580.2	479873.665	1350027.391	Radium-226	1.7	pCi/g	0.3	J	pCi/g	Normal	None
11108	19930724	1	1.5	580.2	479873.665	1350027.391	Radium-226	1.7	pCi/g	0.5	J	pCi/g	Normal	None

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**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

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Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
11108	19930724	2.5	3	580.2	479873.665	1350027.391	Radium-226	1.7	pCi/g	0.25	UJ	pCi/g	Normal	None
11108	19930726	7.5	8.5	580.2	479873.665	1350027.391	Radium-226	1.7	pCi/g	0.9	J	pCi/g	Normal	None
11108	19930725	9	10	580.2	479873.665	1350027.391	Radium-226	1.7	pCi/g	1	J	pCi/g	Normal	None
11109	19930724	0	0.5	578.1	479750.119	1349623.424	Radium-226	1.7	pCi/g	1.1	J	pCi/g	Normal	None
11109	19930724	0	0.5	578.1	479750.13	1349623.49	Radium-226	1.7	pCi/g	0.9	J	pCi/g	Duplicate	None
11109	19930724	1	1.5	578.1	479750.119	1349623.424	Radium-226	1.7	pCi/g	1.1	J	pCi/g	Normal	None
11109	19930724	2.5	3	578.1	479750.119	1349623.424	Radium-226	1.7	pCi/g	2	J	pCi/g	Normal	None
11109	19930724	6	6.5	578.1	479750.119	1349623.424	Radium-226	1.7	pCi/g	1.6	J	pCi/g	Normal	None
11109	19930724	9	9.5	578.1	479750.119	1349623.424	Radium-226	1.7	pCi/g	1.4	J	pCi/g	Normal	None
11110	19930727	0	0.5	578.7	479770.742	1349911.203	Radium-226	1.7	pCi/g	0.3	-	pCi/g	Normal	None
11110	19930727	1	1.5	578.7	479770.742	1349911.203	Radium-226	1.7	pCi/g	0.25	U	pCi/g	Normal	None
11110	19930727	2.5	3	578.7	479770.742	1349911.203	Radium-226	1.7	pCi/g	0.25	U	pCi/g	Normal	None
11110	19930727	6	7	578.7	479770.742	1349911.203	Radium-226	1.7	pCi/g	0.3	-	pCi/g	Normal	None
11110	19930727	9	10	578.7	479770.742	1349911.203	Radium-226	1.7	pCi/g	0.3	-	pCi/g	Normal	None
1168	19890502	0	0.5	578.8	480035.59	1349482.111	Radium-226	1.7	pCi/g	0.684	J	pCi/g	Normal	None
1169	19890412	0	0.5	579.3	480036.893	1349716.01	Radium-226	1.7	pCi/g	0.699	J	pCi/g	Normal	None
1174	19890403	0	0.5		479786.286	1350167.882	Radium-226	1.7	pCi/g	1.21	J	pCi/g	Normal	None
1840	19920808	10.5	11.5	579.1	479994.286	1349189.832	Radium-226	1.7	pCi/g	0.92	-	pCi/g	Normal	None
1840	19920808	13.5	14.5	579.1	479994.286	1349189.832	Radium-226	1.7	pCi/g	0.79	-	pCi/g	Normal	None
1841	19920617	9.5	10.5	579.3	479982.581	1349617.751	Radium-226	1.7	pCi/g	1.04	-	pCi/g	Normal	None
1841	19920619	11.5	12.5	579.3	479982.581	1349617.751	Radium-226	1.7	pCi/g	0.93	-	pCi/g	Normal	None
1842	19920616	8	9		479956.651	1350503.909	Radium-226	1.7	pCi/g	0.93	-	pCi/g	Normal	None
1842	19921209	10.5	11.5		479956.651	1350503.909	Radium-226	1.7	pCi/g	0.77	-	pCi/g	Normal	None
1866	19921218	0	0.5	576.8	479517.363	1350173.445	Radium-226	1.7	pCi/g	1.15	-	pCi/g	Normal	None
1867	19921219	0	0.5	576.6	479527.268	1349724.366	Radium-226	1.7	pCi/g	0.82	-	pCi/g	Normal	None
1868	19921219	0	0.5	575.7	479546.332	1349222.008	Radium-226	1.7	pCi/g	1.06	-	pCi/g	Normal	None
1869	19930106	0	0.5		479725.517	1349472.755	Radium-226	1.7	pCi/g	0.8	-	pCi/g	Normal	None
2118	19881207	12	13.5	579	480042.54	1350326.858	Radium-226	1.7	pCi/g	0.8	J	pCi/g	Normal	None
3068	19880120	0	1.5	578.18	478701.592	1349923.565	Radium-226	1.7	pCi/g	0.5	UJ	pCi/g	Normal	None
3068	19880122	50	51.5	578.18	478701.592	1349923.565	Radium-226	1.7	pCi/g	0.4	J	pCi/g	Normal	None
3068	19880124	115	116.5	578.18	478701.592	1349923.565	Radium-226	1.7	pCi/g	0.4	J	pCi/g	Normal	None
3120	19900118	1.5	3	581.9	480196.635	1350626.186	Radium-226	1.7	pCi/g	1.07	J	pCi/g	Normal	None
3120	19900122	45	46.5	581.9	480196.635	1350626.186	Radium-226	1.7	pCi/g	0.3	U	pCi/g	Normal	None
3120	19900124	115	116.5	581.9	480196.635	1350626.186	Radium-226	1.7	pCi/g	1.01	J	pCi/g	Normal	None
A5-CH-1	20010906	0	0.5		478863.05	1350182.24	Radium-226	1.7	pCi/g	1.164	J	pCi/g	Normal	None
A5-CH-1	20010906	2	2.5		478863.05	1350182.24	Radium-226	1.7	pCi/g	1.388	J	pCi/g	Normal	None
A5-CH-1	20010906	4	4.5		478863.05	1350182.24	Radium-226	1.7	pCi/g	1.071	J	pCi/g	Normal	None
A5-CH-2	20010906	0	0.5		478862.33	1350204.62	Radium-226	1.7	pCi/g	1.137	J	pCi/g	Normal	None
A5-CH-2	20010906	2	2.5		478862.33	1350204.62	Radium-226	1.7	pCi/g	1.277	J	pCi/g	Normal	None
A5-CH-2	20010906	4	4.5		478862.33	1350204.62	Radium-226	1.7	pCi/g	0.845	J	pCi/g	Normal	None
A5-CH-3	20010906	0	0.5		478844.46	1350204.5	Radium-226	1.7	pCi/g	1.103	J	pCi/g	Normal	None

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**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
A5-CH-3	20010906	2	2.5		478844.46	1350204.5	Radium-226	1.7	pCi/g	1.42	J	pCi/g	Normal	None
A5-CH-3	20010906	4	4.5		478844.46	1350204.5	Radium-226	1.7	pCi/g	1.35	J	pCi/g	Normal	None
A5-CH-4	20010906	0	0.5		478845.11	1350181.52	Radium-226	1.7	pCi/g	1.133	J	pCi/g	Normal	None
A5-CH-4	20010906	2	2.5		478845.11	1350181.52	Radium-226	1.7	pCi/g	1.436	J	pCi/g	Normal	None
A5-CH-4	20010906	4	4.5		478845.11	1350181.52	Radium-226	1.7	pCi/g	1.121	J	pCi/g	Normal	None
ESA-2	19930127	0	0.5	577.6	479884.269	1350352.05	Radium-226	1.7	pCi/g	0.83	NV	pCi/g	Normal	None
ESA-5	19930127	0	0.5	577.6	479840.508	1350350.501	Radium-226	1.7	pCi/g	0.89	NV	pCi/g	Normal	None
ESA-8	19930128	0	0.5	577.7	479762.478	1350348.582	Radium-226	1.7	pCi/g	1.24	NV	pCi/g	Normal	None
PUMP1-C-10-RS	19970309	0	0.33		479499	1350598	Radium-226	1.7	pCi/g	1.397	-	pCi/g	Normal	None
PUMP1-C-11-RS	19970309	0	0.33		479516	1350616	Radium-226	1.7	pCi/g	1.323	-	pCi/g	Normal	None
PUMP1-C-11-RS	19970309	0	0.33		479516	1350616	Radium-226	1.7	pCi/g	1.294	-	pCi/g	Duplicate	None
PUMP1-C-12-RS	19970309	0	0.33		479511	1350630	Radium-226	1.7	pCi/g	1.334	-	pCi/g	Normal	None
PUMP1-C-13-RS	19970309	0	0.33		479538	1350583	Radium-226	1.7	pCi/g	1.191	-	pCi/g	Normal	None
PUMP1-C-14-RS	19970309	0	0.33		479541	1350596	Radium-226	1.7	pCi/g	1.352	-	pCi/g	Normal	None
PUMP1-C-15-RS	19970309	0	0.33		479520	1350607	Radium-226	1.7	pCi/g	1.372	-	pCi/g	Normal	None
PUMP1-C-16-RS	19970309	0	0.33		479541	1350624	Radium-226	1.7	pCi/g	1.345	-	pCi/g	Normal	None
PUMP1-C-1-RS	19970307	0	0.33		479461	1350576	Radium-226	1.7	pCi/g	1.637	-	pCi/g	Normal	None
PUMP1-C-2-RS	19970307	0	0.33		479452	1350600	Radium-226	1.7	pCi/g	1.331	-	pCi/g	Normal	None
PUMP1-C-3-RS	19970307	0	0.33		479460	1350617	Radium-226	1.7	pCi/g	1.223	-	pCi/g	Normal	None
PUMP1-C-4-RS	19970307	0	0.33		479451	1350629	Radium-226	1.7	pCi/g	1.324	-	pCi/g	Normal	None
PUMP1-C-5-RS	19970307	0	0.33		479475	1350576	Radium-226	1.7	pCi/g	1.588	-	pCi/g	Normal	None
PUMP1-C-6-RS	19970307	0	0.33		479480	1350600	Radium-226	1.7	pCi/g	1.469	-	pCi/g	Normal	None
PUMP1-C-7-RS	19970309	0	0.33		479484	1350617	Radium-226	1.7	pCi/g	1.43	-	pCi/g	Normal	None
PUMP1-C-8-RS	19970309	0	0.33		479486	1350640	Radium-226	1.7	pCi/g	1.501	-	pCi/g	Normal	None
PUMP1-C-9-RS	19970309	0	0.33		479503	1350581	Radium-226	1.7	pCi/g	1.233	-	pCi/g	Normal	None
PUMP-C-11-RS	19970121	0.5	0.83		479514.05	1350619.22	Radium-226	1.7	pCi/g	1.32	-	pCi/g	Normal	None
PUMP-C-13-RS	19970121	0.5	0.83		479521.05	1350576.25	Radium-226	1.7	pCi/g	0.96	-	pCi/g	Normal	None
PUMP-C-14-RS	19970121	0.5	0.83		479533.05	1350588.05	Radium-226	1.7	pCi/g	1.22	-	pCi/g	Normal	None
PUMP-C-15-RS	19970121	0.5	0.83		479535.14	1350616.14	Radium-226	1.7	pCi/g	1.14	-	pCi/g	Normal	None
PUMP-C-16-RS	19970121	0.5	0.83		479522.09	1350638.16	Radium-226	1.7	pCi/g	1.28	-	pCi/g	Normal	None
PUMP-C-2-RS	19970121	0.5	0.83		479467.08	1350591.09	Radium-226	1.7	pCi/g	1.26	-	pCi/g	Normal	None
PUMP-C-3-RS	19970121	0.5	0.83		479469.12	1350620.67	Radium-226	1.7	pCi/g	1.55	-	pCi/g	Normal	None
PUMP-C-4-RS	19970121	0.5	0.83		479458.1	1350624.69	Radium-226	1.7	pCi/g	1.08	-	pCi/g	Normal	None
PUMP-C-5-RS	19970121	0.5	0.83		479476.98	1350586.2	Radium-226	1.7	pCi/g	1.23	-	pCi/g	Normal	None
PUMP-C-6-RS	19970121	0.5	0.83		479486.38	1350601.33	Radium-226	1.7	pCi/g	1.29	-	pCi/g	Normal	None
PUMP-C-7-RS	19970121	0.5	0.83		479488.18	1350605.39	Radium-226	1.7	pCi/g	1.02	-	pCi/g	Normal	None
PUMP-C-9-RS	19970121	0.5	0.83		479503.02	1350577.22	Radium-226	1.7	pCi/g	1.26	-	pCi/g	Normal	None
ZONE 1-10	19881027	0	0.5		479529.382	1349280.998	Radium-226	1.7	pCi/g	1.1	J	pCi/g	Normal	None
ZONE 1-51	19880622	0	0.5		479754.393	1349950.993	Radium-226	1.7	pCi/g	1	J	pCi/g	Normal	None
ZONE 1-51	19880622	0.5	1		479754.393	1349950.993	Radium-226	1.7	pCi/g	1.7	J	pCi/g	Normal	None
ZONE 1-51	19880622	1	1.5		479754.393	1349950.993	Radium-226	1.7	pCi/g	1.2	J	pCi/g	Normal	None

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**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

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Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
ZONE 1-52	19880927	0	0.5		479754.393	1349990.993	Radium-226	1.7	pCi/g	1.8	-	pCi/g	Normal	None
ZONE 1-54	19881027	0	0.5		479779.391	1349800.993	Radium-226	1.7	pCi/g	1.1	J	pCi/g	Normal	None
ZONE 1-54	19881027	0.5	1		479779.391	1349800.993	Radium-226	1.7	pCi/g	0.8	NV	pCi/g	Normal	None
ZONE 1-54	19881027	1	1.5		479779.391	1349800.993	Radium-226	1.7	pCi/g	0.8	NV	pCi/g	Normal	None
ZONE 1-81	19880927	0	0.5		479979.393	1349775.991	Radium-226	1.7	pCi/g	1	-	pCi/g	Normal	None
ZONE 2-115	19880929	0	0.5		479779.4	1350530.991	Radium-226	1.7	pCi/g	1	J	pCi/g	Normal	None
ZONE 2-116	19881004	0	0.5		479779.403	1350780.99	Radium-226	1.7	pCi/g	1.1	J	pCi/g	Normal	None
ZONE 2-145	19880929	0	0.5		480029.402	1350530.988	Radium-226	1.7	pCi/g	1	J	pCi/g	Normal	None
ZONE 2-147	19881004	0	0.5		480029.406	1350780.987	Radium-226	1.7	pCi/g	0.9	J	pCi/g	Normal	None
ZONE 2-81	19881027	0	0.5		479529.392	1350030.995	Radium-226	1.7	pCi/g	1.1	J	pCi/g	Normal	None
ZONE 2-84	19881027	0	0.5		479529.395	1350280.994	Radium-226	1.7	pCi/g	1.2	J	pCi/g	Normal	None
ZONE 2-90	19881004	0	0.5		479529.401	1350780.993	Radium-226	1.7	pCi/g	0.8	J	pCi/g	Normal	None
ZONE 3-43	19881010	0	0.5		479279.395	1350530.997	Radium-226	1.7	pCi/g	1	J	pCi/g	Normal	None
ZONE 3-44	19881010	0	0.5		479279.398	1350780.996	Radium-226	1.7	pCi/g	1	J	pCi/g	Normal	None
ZONE 3-71	19881027	0	0.5		479529.386	1349530.997	Radium-226	1.7	pCi/g	2.6	J	pCi/g	Normal	None
11108	19930724	0	0.5	580.2	479873.665	1350027.391	Radium-228	1.8	pCi/g	0.5	UJ	pCi/g	Normal	None
11108	19930724	1	1.5	580.2	479873.665	1350027.391	Radium-228	1.8	pCi/g	0.5	U	pCi/g	Normal	None
11108	19930724	2.5	3	580.2	479873.665	1350027.391	Radium-228	1.8	pCi/g	0.5	UJ	pCi/g	Normal	None
11108	19930726	7.5	8.5	580.2	479873.665	1350027.391	Radium-228	1.8	pCi/g	0.6	J	pCi/g	Normal	None
11108	19930725	9	10	580.2	479873.665	1350027.391	Radium-228	1.8	pCi/g	0.5	UJ	pCi/g	Normal	None
11109	19930724	0	0.5	578.1	479750.119	1349623.424	Radium-228	1.8	pCi/g	0.5	U	pCi/g	Normal	None
11109	19930724	0	0.5	578.1	479750.13	1349623.49	Radium-228	1.8	pCi/g	0.3	U	pCi/g	Duplicate	None
11109	19930724	1	1.5	578.1	479750.119	1349623.424	Radium-228	1.8	pCi/g	0.5	U	pCi/g	Normal	None
11109	19930724	2.5	3	578.1	479750.119	1349623.424	Radium-228	1.8	pCi/g	0.5	U	pCi/g	Normal	None
11109	19930724	6	6.5	578.1	479750.119	1349623.424	Radium-228	1.8	pCi/g	0.5	U	pCi/g	Normal	None
11109	19930724	9	9.5	578.1	479750.119	1349623.424	Radium-228	1.8	pCi/g	0.5	U	pCi/g	Normal	None
11110	19930727	0	0.5	578.7	479770.742	1349911.203	Radium-228	1.8	pCi/g	0.5	U	pCi/g	Normal	None
11110	19930727	1	1.5	578.7	479770.742	1349911.203	Radium-228	1.8	pCi/g	0.5	U	pCi/g	Normal	None
11110	19930727	2.5	3	578.7	479770.742	1349911.203	Radium-228	1.8	pCi/g	0.5	U	pCi/g	Normal	None
11110	19930727	6	7	578.7	479770.742	1349911.203	Radium-228	1.8	pCi/g	0.5	U	pCi/g	Normal	None
11110	19930727	9	10	578.7	479770.742	1349911.203	Radium-228	1.8	pCi/g	0.5	U	pCi/g	Normal	None
1168	19890502	0	0.5	578.8	480035.59	1349482.111	Radium-228	1.8	pCi/g	0.975	J	pCi/g	Normal	None
1169	19890412	0	0.5	579.3	480036.893	1349716.01	Radium-228	1.8	pCi/g	0.772	J	pCi/g	Normal	None
1174	19890403	0	0.5		479786.286	1350167.882	Radium-228	1.8	pCi/g	0.757	J	pCi/g	Normal	None
1840	19920808	10.5	11.5	579.1	479994.286	1349189.832	Radium-228	1.8	pCi/g	0.7	-	pCi/g	Normal	None
1840	19920808	13.5	14.5	579.1	479994.286	1349189.832	Radium-228	1.8	pCi/g	0.74	-	pCi/g	Normal	None
1841	19920617	9.5	10.5	579.3	479982.581	1349617.751	Radium-228	1.8	pCi/g	0.78	-	pCi/g	Normal	None
1841	19920619	11.5	12.5	579.3	479982.581	1349617.751	Radium-228	1.8	pCi/g	0.87	-	pCi/g	Normal	None
1842	19920616	8	9		479956.651	1350503.909	Radium-228	1.8	pCi/g	0.71	-	pCi/g	Normal	None
1842	19921209	10.5	11.5		479956.651	1350503.909	Radium-228	1.8	pCi/g	0.59	-	pCi/g	Normal	None
1866	19921218	0	0.5	576.8	479517.363	1350173.445	Radium-228	1.8	pCi/g	1.25	-	pCi/g	Normal	None

**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
1867	19921219	0	0.5	576.6	479527.268	1349724.366	Radium-228	1.8	pCi/g	0.96	-	pCi/g	Normal	None
1868	19921219	0	0.5	575.7	479546.332	1349222.008	Radium-228	1.8	pCi/g	0.87	-	pCi/g	Normal	None
1869	19930106	0	0.5		479725.517	1349472.755	Radium-228	1.8	pCi/g	1.03	-	pCi/g	Normal	None
2118	19881207	12	13.5	579	480042.54	1350326.858	Radium-228	1.8	pCi/g	0.8	J	pCi/g	Normal	None
3068	19880120	0	1.5	578.18	478701.592	1349923.565	Radium-228	1.8	pCi/g	0.8	UJ	pCi/g	Normal	None
3068	19880122	50	51.5	578.18	478701.592	1349923.565	Radium-228	1.8	pCi/g	0.5	UJ	pCi/g	Normal	None
3068	19880124	115	116.5	578.18	478701.592	1349923.565	Radium-228	1.8	pCi/g	0.5	UJ	pCi/g	Normal	None
3120	19900118	1.5	3	581.9	480196.635	1350626.186	Radium-228	1.8	pCi/g	1.2	J	pCi/g	Normal	None
3120	19900122	45	46.5	581.9	480196.635	1350626.186	Radium-228	1.8	pCi/g	0.5	U	pCi/g	Normal	None
3120	19900124	115	116.5	581.9	480196.635	1350626.186	Radium-228	1.8	pCi/g	0.5	U	pCi/g	Normal	None
A5-CH-1	20010906	0	0.5		478863.05	1350182.24	Radium-228	1.8	pCi/g	0.946	J	pCi/g	Normal	None
A5-CH-1	20010906	2	2.5		478863.05	1350182.24	Radium-228	1.8	pCi/g	1.181	J	pCi/g	Normal	None
A5-CH-1	20010906	4	4.5		478863.05	1350182.24	Radium-228	1.8	pCi/g	0.785	J	pCi/g	Normal	None
A5-CH-2	20010906	0	0.5		478862.33	1350204.62	Radium-228	1.8	pCi/g	0.901	J	pCi/g	Normal	None
A5-CH-2	20010906	2	2.5		478862.33	1350204.62	Radium-228	1.8	pCi/g	1.067	J	pCi/g	Normal	None
A5-CH-2	20010906	4	4.5		478862.33	1350204.62	Radium-228	1.8	pCi/g	0.622	J	pCi/g	Normal	None
A5-CH-3	20010906	0	0.5		478844.46	1350204.5	Radium-228	1.8	pCi/g	0.903	J	pCi/g	Normal	None
A5-CH-3	20010906	2	2.5		478844.46	1350204.5	Radium-228	1.8	pCi/g	1.124	J	pCi/g	Normal	None
A5-CH-3	20010906	4	4.5		478844.46	1350204.5	Radium-228	1.8	pCi/g	1.034	J	pCi/g	Normal	None
A5-CH-4	20010906	0	0.5		478845.11	1350181.52	Radium-228	1.8	pCi/g	1.054	J	pCi/g	Normal	None
A5-CH-4	20010906	2	2.5		478845.11	1350181.52	Radium-228	1.8	pCi/g	1.288	J	pCi/g	Normal	None
A5-CH-4	20010906	4	4.5		478845.11	1350181.52	Radium-228	1.8	pCi/g	0.897	J	pCi/g	Normal	None
ESA-2	19930127	0	0.5	577.6	479884.269	1350352.05	Radium-228	1.8	pCi/g	0.52	NV	pCi/g	Normal	None
ESA-5	19930127	0	0.5	577.6	479840.508	1350350.501	Radium-228	1.8	pCi/g	0.67	NV	pCi/g	Normal	None
ESA-8	19930128	0	0.5	577.7	479762.478	1350348.582	Radium-228	1.8	pCi/g	0.99	NV	pCi/g	Normal	None
PUMP1-C-10-RS	19970309	0	0.33		479499	1350598	Radium-228	1.8	pCi/g	1.324	-	pCi/g	Normal	None
PUMP1-C-11-RS	19970309	0	0.33		479516	1350616	Radium-228	1.8	pCi/g	1.389	-	pCi/g	Duplicate	None
PUMP1-C-11-RS	19970309	0	0.33		479516	1350616	Radium-228	1.8	pCi/g	1.056	-	pCi/g	Normal	None
PUMP1-C-12-RS	19970309	0	0.33		479511	1350630	Radium-228	1.8	pCi/g	1.123	-	pCi/g	Normal	None
PUMP1-C-13-RS	19970309	0	0.33		479538	1350583	Radium-228	1.8	pCi/g	1.107	-	pCi/g	Normal	None
PUMP1-C-14-RS	19970309	0	0.33		479541	1350596	Radium-228	1.8	pCi/g	1.224	-	pCi/g	Normal	None
PUMP1-C-15-RS	19970309	0	0.33		479520	1350607	Radium-228	1.8	pCi/g	1.025	-	pCi/g	Normal	None
PUMP1-C-16-RS	19970309	0	0.33		479541	1350624	Radium-228	1.8	pCi/g	1.275	-	pCi/g	Normal	None
PUMP1-C-1-RS	19970307	0	0.33		479461	1350576	Radium-228	1.8	pCi/g	1.469	-	pCi/g	Normal	None
PUMP1-C-2-RS	19970307	0	0.33		479452	1350600	Radium-228	1.8	pCi/g	1.113	-	pCi/g	Normal	None
PUMP1-C-3-RS	19970307	0	0.33		479460	1350617	Radium-228	1.8	pCi/g	1.222	-	pCi/g	Normal	None
PUMP1-C-4-RS	19970307	0	0.33		479451	1350629	Radium-228	1.8	pCi/g	1.444	-	pCi/g	Normal	None
PUMP1-C-5-RS	19970307	0	0.33		479475	1350576	Radium-228	1.8	pCi/g	1.418	-	pCi/g	Normal	None
PUMP1-C-6-RS	19970307	0	0.33		479480	1350600	Radium-228	1.8	pCi/g	1.309	-	pCi/g	Normal	None
PUMP1-C-7-RS	19970309	0	0.33		479484	1350617	Radium-228	1.8	pCi/g	1.312	-	pCi/g	Normal	None
PUMP1-C-8-RS	19970309	0	0.33		479486	1350640	Radium-228	1.8	pCi/g	1.226	-	pCi/g	Normal	None

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**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

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Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	OA Type	Prep ID
PUMP1-C-9-RS	19970309	0	0.33		479503	1350581	Radium-228	1.8	pCi/g	1.078	-	pCi/g	Normal	None
PUMP-C-11-RS	19970121	0.5	0.83		479514.05	1350619.22	Radium-228	1.8	pCi/g	1	UJ	pCi/g	Normal	None
PUMP-C-13-RS	19970121	0.5	0.83		479521.05	1350576.25	Radium-228	1.8	pCi/g	1.46	-	pCi/g	Normal	None
PUMP-C-14-RS	19970121	0.5	0.83		479533.05	1350588.05	Radium-228	1.8	pCi/g	1.24	-	pCi/g	Normal	None
PUMP-C-15-RS	19970121	0.5	0.83		479535.14	1350616.14	Radium-228	1.8	pCi/g	1.35	-	pCi/g	Normal	None
PUMP-C-16-RS	19970121	0.5	0.83		479522.09	1350638.16	Radium-228	1.8	pCi/g	1.78	-	pCi/g	Normal	None
PUMP-C-2-RS	19970121	0.5	0.83		479467.08	1350591.09	Radium-228	1.8	pCi/g	1.23	-	pCi/g	Normal	None
PUMP-C-3-RS	19970121	0.5	0.83		479469.12	1350620.67	Radium-228	1.8	pCi/g	2.26	-	pCi/g	Normal	None
PUMP-C-4-RS	19970121	0.5	0.83		479458.1	1350624.69	Radium-228	1.8	pCi/g	1.19	J	pCi/g	Normal	None
PUMP-C-5-RS	19970121	0.5	0.83		479476.98	1350586.2	Radium-228	1.8	pCi/g	1.17	-	pCi/g	Normal	None
PUMP-C-6-RS	19970121	0.5	0.83		479486.38	1350601.33	Radium-228	1.8	pCi/g	1.41	-	pCi/g	Normal	None
PUMP-C-7-RS	19970121	0.5	0.83		479488.18	1350605.39	Radium-228	1.8	pCi/g	1.55	-	pCi/g	Normal	None
PUMP-C-9-RS	19970121	0.5	0.83		479503.02	1350577.22	Radium-228	1.8	pCi/g	1.33	-	pCi/g	Normal	None
ZONE 1-10	19881027	0	0.5		479529.382	1349280.998	Radium-228	1.8	pCi/g	1	J	pCi/g	Normal	None
ZONE 1-51	19880622	0	0.5		479754.393	1349950.993	Radium-228	1.8	pCi/g	1.3	J	pCi/g	Normal	None
ZONE 1-51	19880622	0.5	1		479754.393	1349950.993	Radium-228	1.8	pCi/g	1.1	J	pCi/g	Normal	None
ZONE 1-51	19880622	1	1.5		479754.393	1349950.993	Radium-228	1.8	pCi/g	1.2	J	pCi/g	Normal	None
ZONE 1-52	19880927	0	0.5		479754.393	1349990.993	Radium-228	1.8	pCi/g	1.1	-	pCi/g	Normal	None
ZONE 1-54	19881027	0	0.5		479779.391	1349800.993	Radium-228	1.8	pCi/g	1	J	pCi/g	Normal	None
ZONE 1-54	19881027	0.5	1		479779.391	1349800.993	Radium-228	1.8	pCi/g	0.7	NV	pCi/g	Normal	None
ZONE 1-54	19881027	1	1.5		479779.391	1349800.993	Radium-228	1.8	pCi/g	0.8	UNV	pCi/g	Normal	None
ZONE 1-81	19880927	0	0.5		479979.393	1349775.991	Radium-228	1.8	pCi/g	0.8	-	pCi/g	Normal	None
ZONE 2-115	19880929	0	0.5		479779.4	1350530.991	Radium-228	1.8	pCi/g	0.8	J	pCi/g	Normal	None
ZONE 2-116	19881004	0	0.5		479779.403	1350780.99	Radium-228	1.8	pCi/g	1.1	J	pCi/g	Normal	None
ZONE 2-145	19880929	0	0.5		480029.402	1350530.988	Radium-228	1.8	pCi/g	0.9	J	pCi/g	Normal	None
ZONE 2-147	19881004	0	0.5		480029.406	1350780.987	Radium-228	1.8	pCi/g	1	J	pCi/g	Normal	None
ZONE 2-81	19881027	0	0.5		479529.392	1350030.995	Radium-228	1.8	pCi/g	1	J	pCi/g	Normal	None
ZONE 2-84	19881027	0	0.5		479529.395	1350280.994	Radium-228	1.8	pCi/g	1.1	J	pCi/g	Normal	None
ZONE 2-90	19881004	0	0.5		479529.401	1350780.993	Radium-228	1.8	pCi/g	0.7	J	pCi/g	Normal	None
ZONE 3-43	19881010	0	0.5		479279.395	1350530.997	Radium-228	1.8	pCi/g	0.9	J	pCi/g	Normal	None
ZONE 3-44	19881010	0	0.5		479279.398	1350780.996	Radium-228	1.8	pCi/g	1	J	pCi/g	Normal	None
ZONE 3-71	19881027	0	0.5		479529.386	1349530.997	Radium-228	1.8	pCi/g	0.7	J	pCi/g	Normal	None
11108	19930724	0	0.5	580.2	479873.665	1350027.391	Thorium-228	1.7	pCi/g	0.5	J	pCi/g	Normal	None
11108	19930724	1	1.5	580.2	479873.665	1350027.391	Thorium-228	1.7	pCi/g	0.4	J	pCi/g	Normal	None
11108	19930724	2.5	3	580.2	479873.665	1350027.391	Thorium-228	1.7	pCi/g	0.1	UJ	pCi/g	Normal	None
11108	19930726	7.5	8.5	580.2	479873.665	1350027.391	Thorium-228	1.7	pCi/g	0.8	J	pCi/g	Normal	None
11109	19930724	0	0.5	578.1	479750.13	1349623.49	Thorium-228	1.7	pCi/g	0.9	-	pCi/g	Duplicate	None
11109	19930724	0	0.5	578.1	479750.119	1349623.424	Thorium-228	1.7	pCi/g	0.9	-	pCi/g	Normal	None
11109	19930724	1	1.5	578.1	479750.119	1349623.424	Thorium-228	1.7	pCi/g	0.6	-	pCi/g	Normal	None
11109	19930724	2.5	3	578.1	479750.119	1349623.424	Thorium-228	1.7	pCi/g	0.9	-	pCi/g	Normal	None
11109	19930724	6	6.5	578.1	479750.119	1349623.424	Thorium-228	1.7	pCi/g	0.8	-	pCi/g	Normal	None

**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
11109	19930724	9	9.5	578.1	479750.119	1349623.424	Thorium-228	1.7	pCi/g	1.1	-	pCi/g	Normal	None
11110	19930727	0	0.5	578.7	479770.742	1349911.203	Thorium-228	1.7	pCi/g	1.3	J	pCi/g	Normal	None
11110	19930727	1	1.5	578.7	479770.742	1349911.203	Thorium-228	1.7	pCi/g	0.6	J	pCi/g	Normal	None
11110	19930727	2.5	3	578.7	479770.742	1349911.203	Thorium-228	1.7	pCi/g	0.8	J	pCi/g	Normal	None
11110	19930727	6	7	578.7	479770.742	1349911.203	Thorium-228	1.7	pCi/g	1	J	pCi/g	Normal	None
11110	19930727	9	10	578.7	479770.742	1349911.203	Thorium-228	1.7	pCi/g	0.7	J	pCi/g	Normal	None
1169	19890412	0	0.5	579.3	480036.893	1349716.01	Thorium-228	1.7	pCi/g	0.983	-	pCi/g	Normal	None
1840	19920808	10.5	11.5	579.1	479994.286	1349189.832	Thorium-228	1.7	pCi/g	0.73	J	pCi/g	Normal	None
1840	19920808	13.5	14.5	579.1	479994.286	1349189.832	Thorium-228	1.7	pCi/g	0.77	J	pCi/g	Normal	None
1842	19920616	8	9		479956.651	1350503.909	Thorium-228	1.7	pCi/g	0.9	J	pCi/g	Normal	None
1842	19921209	10.5	11.5		479956.651	1350503.909	Thorium-228	1.7	pCi/g	0.53	J	pCi/g	Normal	None
1867	19921219	0	0.5	576.6	479527.268	1349724.366	Thorium-228	1.7	pCi/g	0.81	-	pCi/g	Normal	None
1868	19921219	0	0.5	575.7	479546.332	1349222.008	Thorium-228	1.7	pCi/g	0.98	-	pCi/g	Normal	None
2118	19881207	12	13.5	579	480042.54	1350326.858	Thorium-228	1.7	pCi/g	0.6	-	pCi/g	Normal	None
3068	19880120	0	1.5	578.18	478701.592	1349923.565	Thorium-228	1.7	pCi/g	1.7	J	pCi/g	Normal	None
3068	19880122	50	51.5	578.18	478701.592	1349923.565	Thorium-228	1.7	pCi/g	0.6	UJ	pCi/g	Normal	None
3068	19880124	115	116.5	578.18	478701.592	1349923.565	Thorium-228	1.7	pCi/g	0.6	UJ	pCi/g	Normal	None
3120	19900118	1.5	3	581.9	480196.635	1350626.186	Thorium-228	1.7	pCi/g	1	-	pCi/g	Normal	None
3120	19900122	45	46.5	581.9	480196.635	1350626.186	Thorium-228	1.7	pCi/g	0.6	U	pCi/g	Normal	None
3120	19900124	115	116.5	581.9	480196.635	1350626.186	Thorium-228	1.7	pCi/g	2.7	-	pCi/g	Normal	None
A5-CH-1	20010906	0	0.5		478863.05	1350182.24	Thorium-228	1.7	pCi/g	0.928	J	pCi/g	Normal	None
A5-CH-1	20010906	2	2.5		478863.05	1350182.24	Thorium-228	1.7	pCi/g	1.165	J	pCi/g	Normal	None
A5-CH-1	20010906	4	4.5		478863.05	1350182.24	Thorium-228	1.7	pCi/g	0.785	J	pCi/g	Normal	None
A5-CH-2	20010906	0	0.5		478862.33	1350204.62	Thorium-228	1.7	pCi/g	0.891	J	pCi/g	Normal	None
A5-CH-2	20010906	2	2.5		478862.33	1350204.62	Thorium-228	1.7	pCi/g	1.023	J	pCi/g	Normal	None
A5-CH-2	20010906	4	4.5		478862.33	1350204.62	Thorium-228	1.7	pCi/g	0.599	J	pCi/g	Normal	None
A5-CH-3	20010906	0	0.5		478844.46	1350204.5	Thorium-228	1.7	pCi/g	0.869	J	pCi/g	Normal	None
A5-CH-3	20010906	2	2.5		478844.46	1350204.5	Thorium-228	1.7	pCi/g	1.111	J	pCi/g	Normal	None
A5-CH-3	20010906	4	4.5		478844.46	1350204.5	Thorium-228	1.7	pCi/g	1.002	J	pCi/g	Normal	None
A5-CH-4	20010906	0	0.5		478845.11	1350181.52	Thorium-228	1.7	pCi/g	1.045	J	pCi/g	Normal	None
A5-CH-4	20010906	2	2.5		478845.11	1350181.52	Thorium-228	1.7	pCi/g	1.275	J	pCi/g	Normal	None
A5-CH-4	20010906	4	4.5		478845.11	1350181.52	Thorium-228	1.7	pCi/g	0.862	J	pCi/g	Normal	None
ESA-2	19930127	0	0.5	577.6	479884.269	1350352.05	Thorium-228	1.7	pCi/g	0.519	J	pCi/g	Normal	None
ESA-5	19930127	0	0.5	577.6	479840.508	1350350.501	Thorium-228	1.7	pCi/g	0.64	J	pCi/g	Normal	None
ESA-8	19930128	0	0.5	577.7	479762.478	1350348.582	Thorium-228	1.7	pCi/g	1.02	J	pCi/g	Normal	None
P23-1		0	0		479746.34	1349783.85	Thorium-228	1.7	pCi/g	5.1	UNV	pCi/g		None
P23-2		0	0		479892.81	1349790.71	Thorium-228	1.7	pCi/g	5.6	UNV	pCi/g		None
P23-3		0	0		479949.51	1349794.35	Thorium-228	1.7	pCi/g	5.1	NV	pCi/g		None
P23-4		0	0		479980.81	1349835.63	Thorium-228	1.7	pCi/g	5.1	UNV	pCi/g		None
P23-5		0	0		480039.49	1349846.07	Thorium-228	1.7	pCi/g	3.6	NV	pCi/g		None
P23-8		0	0		480038.9	1349998.26	Thorium-228	1.7	pCi/g	4.4	NV	pCi/g		None

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**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

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Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
P23-9		0	0		480018.23	1349987.42	Thorium-228	1.7	pCi/g	5.4	UNV	pCi/g		None
P27-SP1	19910929	0	0.5		479610.54	1350230.92	Thorium-228	1.7	pCi/g	1.4	NV	pCi/g		None
P27-SP2	19910929	0	0.5		479634.16	1350211.6	Thorium-228	1.7	pCi/g	1.8	NV	pCi/g		None
P27-SP3	19910929	0	0.5		479625.89	1350259.08	Thorium-228	1.7	pCi/g	1.4	NV	pCi/g		None
P27-SP4	19910929	0	0.5		479624.12	1350318.61	Thorium-228	1.7	pCi/g	0.83	NV	pCi/g		None
P5-1	19930622	0	3		479917.76	1350363.63	Thorium-228	1.7	pCi/g	1.2	NV	pCi/g		None
P5-1	19930622	0	3		479917.76	1350363.63	Thorium-228	1.7	pCi/g	1.1	NV	pCi/g		None
P5-1	19930622	0	3		479917.76	1350363.63	Thorium-228	1.7	pCi/g	0.78	NV	pCi/g		None
P5-10	19930624	0	0.5		479744.44	1350356.34	Thorium-228	1.7	pCi/g	0.84	NV	pCi/g		None
P5-10	19930624	0	1		479744.44	1350356.34	Thorium-228	1.7	pCi/g	1.1	NV	pCi/g		None
P5-10	19930624	0	3		479744.44	1350356.34	Thorium-228	1.7	pCi/g	1.3	NV	pCi/g		None
P5-11	19930624	0	0.5		479775.44	1350388.33	Thorium-228	1.7	pCi/g	1.5	NV	pCi/g		None
P5-11	19930624	0	1		479775.44	1350388.33	Thorium-228	1.7	pCi/g	1.1	NV	pCi/g		None
P5-11	19930624	0	3		479775.44	1350388.33	Thorium-228	1.7	pCi/g	1.2	NV	pCi/g		None
P5-12	19930624	0	0.5		479738.78	1350387.27	Thorium-228	1.7	pCi/g	1.1	NV	pCi/g		None
P5-12	19930624	0	1		479738.78	1350387.27	Thorium-228	1.7	pCi/g	1.6	NV	pCi/g		None
P5-12	19930624	0	3		479738.78	1350387.27	Thorium-228	1.7	pCi/g	1.1	NV	pCi/g		None
P5-13	19930629	0	0.5		479905.88	1350275.77	Thorium-228	1.7	pCi/g	0.37	NV	pCi/g		None
P5-13	19930629	0	1		479905.88	1350275.77	Thorium-228	1.7	pCi/g	0.37	NV	pCi/g		None
P5-16	19930629	0	0.5		479883.26	1350270.45	Thorium-228	1.7	pCi/g	0.8	NV	pCi/g		None
P5-18	19930628	0	0.5		479883.26	1350327.25	Thorium-228	1.7	pCi/g	0.7	NV	pCi/g		None
P5-18	19930628	0	1		479883.26	1350327.25	Thorium-228	1.7	pCi/g	0.65	NV	pCi/g		None
P5-19	19930628	0	0.5		479857.02	1350272.71	Thorium-228	1.7	pCi/g	0.87	NV	pCi/g		None
P5-19	19930628	0	1		479857.02	1350272.71	Thorium-228	1.7	pCi/g	0.97	NV	pCi/g		None
P5-19	19930628	0	3		479857.02	1350272.71	Thorium-228	1.7	pCi/g	0.94	NV	pCi/g		None
P5-2	19930622	0	3		479879.77	1350362.57	Thorium-228	1.7	pCi/g	0.93	NV	pCi/g		None
P5-2	19930622	0	3		479879.77	1350362.57	Thorium-228	1.7	pCi/g	0.69	NV	pCi/g		None
P5-20	19930624	0	0.5		479843.9	1350285.62	Thorium-228	1.7	pCi/g	1.1	NV	pCi/g		None
P5-20	19930624	0	1		479843.9	1350285.62	Thorium-228	1.7	pCi/g	1.4	NV	pCi/g		None
P5-20	19930629	0	1		479843.9	1350285.62	Thorium-228	1.7	pCi/g	1.1	NV	pCi/g		None
P5-20	19930629	0	3		479843.9	1350285.62	Thorium-228	1.7	pCi/g	0.61	NV	pCi/g		None
P5-21	19930624	0	0.5		479843.9	1350324.43	Thorium-228	1.7	pCi/g	0.73	NV	pCi/g		None
P5-21	19940624	0	1		479843.9	1350324.43	Thorium-228	1.7	pCi/g	1.1	NV	pCi/g		None
P5-21	19930624	0	3		479843.9	1350324.43	Thorium-228	1.7	pCi/g	1.2	NV	pCi/g		None
P5-3	19930622	0	3		479918.1	1350389.37	Thorium-228	1.7	pCi/g	1.3	NV	pCi/g		None
P5-6	19930623	0	3		479803.44	1350359.94	Thorium-228	1.7	pCi/g	1.3	NV	pCi/g		None
P5-6	19930623	0	3		479803.44	1350359.94	Thorium-228	1.7	pCi/g	1.1	NV	pCi/g		None
P5-6	19930623	0	3		479803.44	1350359.94	Thorium-228	1.7	pCi/g	1	NV	pCi/g		None
P5-7	19930623	0	3		479851.43	1350390.02	Thorium-228	1.7	pCi/g	1.3	NV	pCi/g		None
P5-7	19930623	0	3		479851.43	1350390.02	Thorium-228	1.7	pCi/g	1.2	NV	pCi/g		None
P5-7	19930623	0	3		479851.43	1350390.02	Thorium-228	1.7	pCi/g	0.71	NV	pCi/g		None

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**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
P5-8	19930623	0	0.5		479803.11	1350390.4	Thorium-228	1.7	pCi/g	1.5	NV	pCi/g		None
P5-8	19930623	0	1		479803.11	1350390.4	Thorium-228	1.7	pCi/g	1	NV	pCi/g		None
P5-8	19930623	0	3		479803.11	1350390.4	Thorium-228	1.7	pCi/g	0.92	NV	pCi/g		None
P5-9	19930624	0	0.5		479776.11	1350358.91	Thorium-228	1.7	pCi/g	1.4	NV	pCi/g		None
P5-9	19930624	0	1		479776.11	1350358.91	Thorium-228	1.7	pCi/g	0.89	NV	pCi/g		None
P5-9	19930624	0	3		479776.11	1350358.91	Thorium-228	1.7	pCi/g	0.98	NV	pCi/g		None
PUMP1-C-10-RS	19970309	0	0.33		479499	1350598	Thorium-228	1.7	pCi/g	1.385	J	pCi/g	Normal	None
PUMP1-C-10-RS	19970309	0	0.33		479499	1350598	Thorium-228	1.7	pCi/g	1.05	-	pCi/g	Normal	None
PUMP1-C-11-RS	19970309	0	0.33		479516	1350616	Thorium-228	1.7	pCi/g	1.554	J	pCi/g	Normal	None
PUMP1-C-11-RS	19970309	0	0.33		479516	1350616	Thorium-228	1.7	pCi/g	1.272	-	pCi/g	Duplicate	None
PUMP1-C-11-RS	19970309	0	0.33		479516	1350616	Thorium-228	1.7	pCi/g	1.251	J	pCi/g	Duplicate	None
PUMP1-C-11-RS	19970309	0	0.33		479516	1350616	Thorium-228	1.7	pCi/g	1.222	-	pCi/g	Normal	None
PUMP1-C-12-RS	19970309	0	0.33		479511	1350630	Thorium-228	1.7	pCi/g	1.278	J	pCi/g	Normal	None
PUMP1-C-12-RS	19970309	0	0.33		479511	1350630	Thorium-228	1.7	pCi/g	1.09	-	pCi/g	Normal	None
PUMP1-C-13-RS	19970309	0	0.33		479538	1350583	Thorium-228	1.7	pCi/g	1.242	J	pCi/g	Normal	None
PUMP1-C-13-RS	19970309	0	0.33		479538	1350583	Thorium-228	1.7	pCi/g	1.205	-	pCi/g	Normal	None
PUMP1-C-14-RS	19970309	0	0.33		479541	1350596	Thorium-228	1.7	pCi/g	1.344	J	pCi/g	Normal	None
PUMP1-C-14-RS	19970309	0	0.33		479541	1350596	Thorium-228	1.7	pCi/g	1.23	-	pCi/g	Normal	None
PUMP1-C-15-RS	19970309	0	0.33		479520	1350607	Thorium-228	1.7	pCi/g	1.283	J	pCi/g	Normal	None
PUMP1-C-15-RS	19970309	0	0.33		479520	1350607	Thorium-228	1.7	pCi/g	1.213	-	pCi/g	Normal	None
PUMP1-C-16-RS	19970309	0	0.33		479541	1350624	Thorium-228	1.7	pCi/g	1.361	-	pCi/g	Normal	None
PUMP1-C-16-RS	19970309	0	0.33		479541	1350624	Thorium-228	1.7	pCi/g	1.316	J	pCi/g	Normal	None
PUMP1-C-1-RS	19970307	0	0.33		479461	1350576	Thorium-228	1.7	pCi/g	1.654	-	pCi/g	Normal	None
PUMP1-C-1-RS	19970307	0	0.33		479461	1350576	Thorium-228	1.7	pCi/g	1.417	-	pCi/g	Normal	None
PUMP1-C-2-RS	19970307	0	0.33		479452	1350600	Thorium-228	1.7	pCi/g	1.418	J	pCi/g	Normal	None
PUMP1-C-2-RS	19970307	0	0.33		479452	1350600	Thorium-228	1.7	pCi/g	1.221	-	pCi/g	Normal	None
PUMP1-C-3-RS	19970307	0	0.33		479460	1350617	Thorium-228	1.7	pCi/g	1.347	-	pCi/g	Normal	None
PUMP1-C-3-RS	19970307	0	0.33		479460	1350617	Thorium-228	1.7	pCi/g	1.274	-	pCi/g	Normal	None
PUMP1-C-4-RS	19970307	0	0.33		479451	1350629	Thorium-228	1.7	pCi/g	1.366	-	pCi/g	Normal	None
PUMP1-C-4-RS	19970307	0	0.33		479451	1350629	Thorium-228	1.7	pCi/g	1.333	-	pCi/g	Normal	None
PUMP1-C-5-RS	19970307	0	0.33		479475	1350576	Thorium-228	1.7	pCi/g	1.265	-	pCi/g	Normal	None
PUMP1-C-6-RS	19970307	0	0.33		479480	1350600	Thorium-228	1.7	pCi/g	1.369	-	pCi/g	Normal	None
PUMP1-C-6-RS	19970307	0	0.33		479480	1350600	Thorium-228	1.7	pCi/g	1.228	J	pCi/g	Normal	None
PUMP1-C-7-RS	19970309	0	0.33		479484	1350617	Thorium-228	1.7	pCi/g	1.34	-	pCi/g	Normal	None
PUMP1-C-7-RS	19970309	0	0.33		479484	1350617	Thorium-228	1.7	pCi/g	1.185	-	pCi/g	Normal	None
PUMP1-C-8-RS	19970309	0	0.33		479486	1350640	Thorium-228	1.7	pCi/g	1.429	-	pCi/g	Normal	None
PUMP1-C-8-RS	19970309	0	0.33		479486	1350640	Thorium-228	1.7	pCi/g	1.255	-	pCi/g	Normal	None
PUMP1-C-9-RS	19970309	0	0.33		479503	1350581	Thorium-228	1.7	pCi/g	1.435	-	pCi/g	Normal	None
PUMP1-C-9-RS	19970309	0	0.33		479503	1350581	Thorium-228	1.7	pCi/g	1.044	-	pCi/g	Normal	None
PUMP-C-11-RS	19970121	0.5	0.83		479514.05	1350619.22	Thorium-228	1.7	pCi/g	1.27	-	pCi/g	Normal	None
PUMP-C-11-RS	19970121	0.5	0.83		479514.05	1350619.22	Thorium-228	1.7	pCi/g	1.1	-	pCi/g	Normal	None

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**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

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Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
PUMP-C-13-RS	19970121	0.5	0.83		479521.05	1350576.25	Thorium-228	1.7	pCi/g	1.3	-	pCi/g	Normal	None
PUMP-C-13-RS	19970121	0.5	0.83		479521.05	1350576.25	Thorium-228	1.7	pCi/g	1.23	-	pCi/g	Normal	None
PUMP-C-14-RS	19970121	0.5	0.83		479533.05	1350588.05	Thorium-228	1.7	pCi/g	1.24	-	pCi/g	Normal	None
PUMP-C-14-RS	19970121	0.5	0.83		479533.05	1350588.05	Thorium-228	1.7	pCi/g	1.02	-	pCi/g	Normal	None
PUMP-C-15-RS	19970121	0.5	0.83		479535.14	1350616.14	Thorium-228	1.7	pCi/g	1.13	-	pCi/g	Normal	None
PUMP-C-15-RS	19970121	0.5	0.83		479535.14	1350616.14	Thorium-228	1.7	pCi/g	1.06	-	pCi/g	Normal	None
PUMP-C-16-RS	19970121	0.5	0.83		479522.09	1350638.16	Thorium-228	1.7	pCi/g	1.26	-	pCi/g	Normal	None
PUMP-C-16-RS	19970121	0.5	0.83		479522.09	1350638.16	Thorium-228	1.7	pCi/g	1.18	-	pCi/g	Normal	None
PUMP-C-2-RS	19970121	0.5	0.83		479467.08	1350591.09	Thorium-228	1.7	pCi/g	1.19	-	pCi/g	Normal	None
PUMP-C-2-RS	19970121	0.5	0.83		479467.08	1350591.09	Thorium-228	1.7	pCi/g	0.996	-	pCi/g	Normal	None
PUMP-C-3-RS	19970121	0.5	0.83		479469.12	1350620.67	Thorium-228	1.7	pCi/g	1.28	-	pCi/g	Normal	None
PUMP-C-3-RS	19970121	0.5	0.83		479469.12	1350620.67	Thorium-228	1.7	pCi/g	1.15	-	pCi/g	Normal	None
PUMP-C-4-RS	19970121	0.5	0.83		479458.1	1350624.69	Thorium-228	1.7	pCi/g	1.17	-	pCi/g	Normal	None
PUMP-C-4-RS	19970121	0.5	0.83		479458.1	1350624.69	Thorium-228	1.7	pCi/g	1.14	-	pCi/g	Normal	None
PUMP-C-5-RS	19970121	0.5	0.83		479476.98	1350586.2	Thorium-228	1.7	pCi/g	1.45	-	pCi/g	Normal	None
PUMP-C-5-RS	19970121	0.5	0.83		479476.98	1350586.2	Thorium-228	1.7	pCi/g	1.19	-	pCi/g	Normal	None
PUMP-C-6-RS	19970121	0.5	0.83		479486.38	1350601.33	Thorium-228	1.7	pCi/g	1.24	-	pCi/g	Normal	None
PUMP-C-6-RS	19970121	0.5	0.83		479486.38	1350601.33	Thorium-228	1.7	pCi/g	1.2	-	pCi/g	Normal	None
PUMP-C-7-RS	19970121	0.5	0.83		479488.18	1350605.39	Thorium-228	1.7	pCi/g	1.11	-	pCi/g	Normal	None
PUMP-C-7-RS	19970121	0.5	0.83		479488.18	1350605.39	Thorium-228	1.7	pCi/g	0.912	-	pCi/g	Normal	None
PUMP-C-9-RS	19970121	0.5	0.83		479503.02	1350577.22	Thorium-228	1.7	pCi/g	0.953	-	pCi/g	Normal	None
PUMP-C-9-RS	19970121	0.5	0.83		479503.02	1350577.22	Thorium-228	1.7	pCi/g	0.913	-	pCi/g	Normal	None
ZONE 1-10	19881027	0	0.5		479529.382	1349280.998	Thorium-228	1.7	pCi/g	0.8	-	pCi/g	Normal	None
ZONE 1-51	19880622	0	0.5		479754.393	1349950.993	Thorium-228	1.7	pCi/g	1.5	J	pCi/g	Normal	None
ZONE 1-51	19880622	0.5	1		479754.393	1349950.993	Thorium-228	1.7	pCi/g	1.5	-	pCi/g	Normal	None
ZONE 1-51	19880622	1	1.5		479754.393	1349950.993	Thorium-228	1.7	pCi/g	1.3	-	pCi/g	Normal	None
ZONE 1-52	19880927	0	0.5		479754.393	1349990.993	Thorium-228	1.7	pCi/g	1	-	pCi/g	Normal	None
ZONE 1-54	19881027	0	0.5		479779.391	1349800.993	Thorium-228	1.7	pCi/g	0.8	J	pCi/g	Normal	None
ZONE 1-54	19881027	0.5	1		479779.391	1349800.993	Thorium-228	1.7	pCi/g	0.8	NV	pCi/g	Normal	None
ZONE 1-54	19881027	1	1.5		479779.391	1349800.993	Thorium-228	1.7	pCi/g	0.6	UNV	pCi/g	Normal	None
ZONE 1-81	19880927	0	0.5		479979.393	1349775.991	Thorium-228	1.7	pCi/g	0.8	-	pCi/g	Normal	None
ZONE 2-115	19880929	0	0.5		479779.4	1350530.991	Thorium-228	1.7	pCi/g	0.8	-	pCi/g	Normal	None
ZONE 2-116	19881004	0	0.5		479779.403	1350780.99	Thorium-228	1.7	pCi/g	1	-	pCi/g	Normal	None
ZONE 2-145	19880929	0	0.5		480029.402	1350530.988	Thorium-228	1.7	pCi/g	1	-	pCi/g	Normal	None
ZONE 2-81	19881027	0	0.5		479529.392	1350030.995	Thorium-228	1.7	pCi/g	0.8	J	pCi/g	Normal	None
ZONE 2-84	19881027	0	0.5		479529.395	1350280.994	Thorium-228	1.7	pCi/g	0.8	J	pCi/g	Normal	None
ZONE 2-87	19880929	0	0.5		479529.398	1350530.994	Thorium-228	1.7	pCi/g	1.1	-	pCi/g	Normal	None
ZONE 2-90	19881004	0	0.5		479529.401	1350780.993	Thorium-228	1.7	pCi/g	0.8	-	pCi/g	Normal	None
ZONE 3-43	19881010	0	0.5		479279.395	1350530.997	Thorium-228	1.7	pCi/g	0.8	-	pCi/g	Normal	None
ZONE 3-44	19881010	0	0.5		479279.398	1350780.996	Thorium-228	1.7	pCi/g	0.9	-	pCi/g	Normal	None
ZONE 3-71	19881027	0	0.5		479529.386	1349530.997	Thorium-228	1.7	pCi/g	0.7	J	pCi/g	Normal	None

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**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
11108	19930724	0	0.5	580.2	479873.665	1350027.391	Thorium-232	1.5	pCi/g	0.4	J	pCi/g	Normal	None
11108	19930724	1	1.5	580.2	479873.665	1350027.391	Thorium-232	1.5	pCi/g	0.4	J	pCi/g	Normal	None
11108	19930724	2.5	3	580.2	479873.665	1350027.391	Thorium-232	1.5	pCi/g	0.1	UJ	pCi/g	Normal	None
11108	19930726	7.5	8.5	580.2	479873.665	1350027.391	Thorium-232	1.5	pCi/g	0.7	J	pCi/g	Normal	None
11109	19930724	0	0.5	578.1	479750.119	1349623.424	Thorium-232	1.5	pCi/g	0.8	-	pCi/g	Normal	None
11109	19930724	0	0.5	578.1	479750.13	1349623.49	Thorium-232	1.5	pCi/g	0.6	-	pCi/g	Duplicate	None
11109	19930724	1	1.5	578.1	479750.119	1349623.424	Thorium-232	1.5	pCi/g	0.7	-	pCi/g	Normal	None
11109	19930724	2.5	3	578.1	479750.119	1349623.424	Thorium-232	1.5	pCi/g	0.9	-	pCi/g	Normal	None
11109	19930724	6	6.5	578.1	479750.119	1349623.424	Thorium-232	1.5	pCi/g	0.8	-	pCi/g	Normal	None
11109	19930724	9	9.5	578.1	479750.119	1349623.424	Thorium-232	1.5	pCi/g	0.8	-	pCi/g	Normal	None
11110	19930727	0	0.5	578.7	479770.742	1349911.203	Thorium-232	1.5	pCi/g	1.2	J	pCi/g	Normal	None
11110	19930727	1	1.5	578.7	479770.742	1349911.203	Thorium-232	1.5	pCi/g	0.6	J	pCi/g	Normal	None
11110	19930727	2.5	3	578.7	479770.742	1349911.203	Thorium-232	1.5	pCi/g	0.8	J	pCi/g	Normal	None
11110	19930727	6	7	578.7	479770.742	1349911.203	Thorium-232	1.5	pCi/g	1	J	pCi/g	Normal	None
11110	19930727	9	10	578.7	479770.742	1349911.203	Thorium-232	1.5	pCi/g	0.7	J	pCi/g	Normal	None
1168	19890502	0	0.5	578.8	480035.59	1349482.111	Thorium-232	1.5	pCi/g	2.67	-	pCi/g	Normal	None
1169	19890412	0	0.5	579.3	480036.893	1349716.01	Thorium-232	1.5	pCi/g	0.741	-	pCi/g	Normal	None
1174	19890403	0	0.5		479786.286	1350167.882	Thorium-232	1.5	pCi/g	0.933	-	pCi/g	Normal	None
1840	19920808	10.5	11.5	579.1	479994.286	1349189.832	Thorium-232	1.5	pCi/g	0.625	-	pCi/g	Normal	None
1840	19920808	13.5	14.5	579.1	479994.286	1349189.832	Thorium-232	1.5	pCi/g	0.6	U	pCi/g	Normal	None
1842	19920616	8	9		479956.651	1350503.909	Thorium-232	1.5	pCi/g	0.627	J	pCi/g	Normal	None
1842	19921209	10.5	11.5		479956.651	1350503.909	Thorium-232	1.5	pCi/g	0.483	J	pCi/g	Normal	None
1867	19921219	0	0.5	576.6	479527.268	1349724.366	Thorium-232	1.5	pCi/g	0.856	J	pCi/g	Normal	None
1868	19921219	0	0.5	575.7	479546.332	1349222.008	Thorium-232	1.5	pCi/g	0.907	J	pCi/g	Normal	None
2118	19881207	12	13.5	579	480042.54	1350326.858	Thorium-232	1.5	pCi/g	0.7	-	pCi/g	Normal	None
3068	19880120	0	1.5	578.18	478701.592	1349923.565	Thorium-232	1.5	pCi/g	1.1	J	pCi/g	Normal	None
3068	19880122	50	51.5	578.18	478701.592	1349923.565	Thorium-232	1.5	pCi/g	0.6	UJ	pCi/g	Normal	None
3068	19880124	115	116.5	578.18	478701.592	1349923.565	Thorium-232	1.5	pCi/g	0.6	UJ	pCi/g	Normal	None
3120	19900118	1.5	3	581.9	480196.635	1350626.186	Thorium-232	1.5	pCi/g	0.6	U	pCi/g	Normal	None
3120	19900122	45	46.5	581.9	480196.635	1350626.186	Thorium-232	1.5	pCi/g	0.6	U	pCi/g	Normal	None
3120	19900124	115	116.5	581.9	480196.635	1350626.186	Thorium-232	1.5	pCi/g	2.9	-	pCi/g	Normal	None
A5-CH-1	20010906	0	0.5		478863.05	1350182.24	Thorium-232	1.5	pCi/g	0.946	J	pCi/g	Normal	None
A5-CH-1	20010906	2	2.5		478863.05	1350182.24	Thorium-232	1.5	pCi/g	1.181	J	pCi/g	Normal	None
A5-CH-1	20010906	4	4.5		478863.05	1350182.24	Thorium-232	1.5	pCi/g	0.785	J	pCi/g	Normal	None
A5-CH-2	20010906	0	0.5		478862.33	1350204.62	Thorium-232	1.5	pCi/g	0.901	J	pCi/g	Normal	None
A5-CH-2	20010906	2	2.5		478862.33	1350204.62	Thorium-232	1.5	pCi/g	1.067	J	pCi/g	Normal	None
A5-CH-2	20010906	4	4.5		478862.33	1350204.62	Thorium-232	1.5	pCi/g	0.622	J	pCi/g	Normal	None
A5-CH-3	20010906	0	0.5		478844.46	1350204.5	Thorium-232	1.5	pCi/g	0.903	J	pCi/g	Normal	None
A5-CH-3	20010906	2	2.5		478844.46	1350204.5	Thorium-232	1.5	pCi/g	1.124	J	pCi/g	Normal	None
A5-CH-3	20010906	4	4.5		478844.46	1350204.5	Thorium-232	1.5	pCi/g	1.034	J	pCi/g	Normal	None
A5-CH-4	20010906	0	0.5		478845.11	1350181.52	Thorium-232	1.5	pCi/g	1.054	J	pCi/g	Normal	None

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**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

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Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
A5-CH-4	20010906	2	2.5		478845.11	1350181.52	Thorium-232	1.5	pCi/g	1.288	J	pCi/g	Normal	None
A5-CH-4	20010906	4	4.5		478845.11	1350181.52	Thorium-232	1.5	pCi/g	0.897	J	pCi/g	Normal	None
ESA-2	19930127	0	0.5	577.6	479884.269	1350352.05	Thorium-232	1.5	pCi/g	0.521	J	pCi/g	Normal	None
ESA-5	19930127	0	0.5	577.6	479840.508	1350350.501	Thorium-232	1.5	pCi/g	0.61	J	pCi/g	Normal	None
ESA-8	19930128	0	0.5	577.7	479762.478	1350348.582	Thorium-232	1.5	pCi/g	1.066	J	pCi/g	Normal	None
P27-SP1	19910929	0	0.5		479610.54	1350230.92	Thorium-232	1.5	pCi/g	1.4	NV	pCi/g		None
P27-SP2	19910929	0	0.5		479634.16	1350211.6	Thorium-232	1.5	pCi/g	2	NV	pCi/g		None
P27-SP3	19910929	0	0.5		479625.89	1350259.08	Thorium-232	1.5	pCi/g	1.2	NV	pCi/g		None
P27-SP4	19910929	0	0.5		479624.12	1350318.61	Thorium-232	1.5	pCi/g	1.2	NV	pCi/g		None
P5-1	19930622	0	3		479917.76	1350363.63	Thorium-232	1.5	pCi/g	0.88	NV	pCi/g		None
P5-1	19930622	0	3		479917.76	1350363.63	Thorium-232	1.5	pCi/g	0.81	NV	pCi/g		None
P5-1	19930622	0	3		479917.76	1350363.63	Thorium-232	1.5	pCi/g	0.78	NV	pCi/g		None
P5-10	19930624	0	0.5		479744.44	1350356.34	Thorium-232	1.5	pCi/g	0.77	NV	pCi/g		None
P5-10	19930624	0	1		479744.44	1350356.34	Thorium-232	1.5	pCi/g	1.2	NV	pCi/g		None
P5-10	19930624	0	3		479744.44	1350356.34	Thorium-232	1.5	pCi/g	0.83	NV	pCi/g		None
P5-11	19930624	0	0.5		479775.44	1350388.33	Thorium-232	1.5	pCi/g	1.2	NV	pCi/g		None
P5-11	19930624	0	1		479775.44	1350388.33	Thorium-232	1.5	pCi/g	1.1	NV	pCi/g		None
P5-11	19930624	0	3		479775.44	1350388.33	Thorium-232	1.5	pCi/g	0.95	NV	pCi/g		None
P5-12	19930624	0	0.5		479738.78	1350387.27	Thorium-232	1.5	pCi/g	1.2	NV	pCi/g		None
P5-12	19930624	0	1		479738.78	1350387.27	Thorium-232	1.5	pCi/g	0.97	NV	pCi/g		None
P5-12	19930624	0	3		479738.78	1350387.27	Thorium-232	1.5	pCi/g	0.66	NV	pCi/g		None
P5-13	19930629	0	0.5		479905.88	1350275.77	Thorium-232	1.5	pCi/g	0.34	NV	pCi/g		None
P5-13	19930629	0	1		479905.88	1350275.77	Thorium-232	1.5	pCi/g	0.34	NV	pCi/g		None
P5-16	19930629	0	0.5		479883.26	1350270.45	Thorium-232	1.5	pCi/g	0.75	NV	pCi/g		None
P5-18	19930628	0	0.5		479883.26	1350327.25	Thorium-232	1.5	pCi/g	0.62	NV	pCi/g		None
P5-18	19930628	0	1		479883.26	1350327.25	Thorium-232	1.5	pCi/g	0.61	NV	pCi/g		None
P5-19	19930628	0	0.5		479857.02	1350272.71	Thorium-232	1.5	pCi/g	0.85	NV	pCi/g		None
P5-19	19930628	0	1		479857.02	1350272.71	Thorium-232	1.5	pCi/g	0.96	NV	pCi/g		None
P5-19	19930628	0	3		479857.02	1350272.71	Thorium-232	1.5	pCi/g	0.85	NV	pCi/g		None
P5-2	19930622	0	3		479879.77	1350362.57	Thorium-232	1.5	pCi/g	0.8	NV	pCi/g		None
P5-2	19930622	0	3		479879.77	1350362.57	Thorium-232	1.5	pCi/g	0.78	NV	pCi/g		None
P5-20	19930624	0	0.5		479843.9	1350285.62	Thorium-232	1.5	pCi/g	1.2	NV	pCi/g		None
P5-20	19930624	0	1		479843.9	1350285.62	Thorium-232	1.5	pCi/g	1.2	NV	pCi/g		None
P5-20	19930629	0	1		479843.9	1350285.62	Thorium-232	1.5	pCi/g	1.1	NV	pCi/g		None
P5-20	19930629	0	3		479843.9	1350285.62	Thorium-232	1.5	pCi/g	0.58	NV	pCi/g		None
P5-21	19930624	0	0.5		479843.9	1350324.43	Thorium-232	1.5	pCi/g	1.1	NV	pCi/g		None
P5-21	19940624	0	1		479843.9	1350324.43	Thorium-232	1.5	pCi/g	1.2	NV	pCi/g		None
P5-21	19930624	0	3		479843.9	1350324.43	Thorium-232	1.5	pCi/g	1.3	NV	pCi/g		None
P5-3	19930622	0	3		479918.1	1350389.37	Thorium-232	1.5	pCi/g	0.96	NV	pCi/g		None
P5-6	19930623	0	3		479803.44	1350359.94	Thorium-232	1.5	pCi/g	1.1	NV	pCi/g		None
P5-6	19930623	0	3		479803.44	1350359.94	Thorium-232	1.5	pCi/g	1.1	NV	pCi/g		None

**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
P5-6	19930623	0	3		479803.44	1350359.94	Thorium-232	1.5	pCi/g	0.89	NV	pCi/g		None
P5-7	19930623	0	3		479851.43	1350390.02	Thorium-232	1.5	pCi/g	1.2	NV	pCi/g		None
P5-7	19930623	0	3		479851.43	1350390.02	Thorium-232	1.5	pCi/g	0.93	NV	pCi/g		None
P5-7	19930623	0	3		479851.43	1350390.02	Thorium-232	1.5	pCi/g	0.92	NV	pCi/g		None
P5-8	19930623	0	0.5		479803.11	1350390.4	Thorium-232	1.5	pCi/g	1	NV	pCi/g		None
P5-8	19930623	0	1		479803.11	1350390.4	Thorium-232	1.5	pCi/g	0.82	NV	pCi/g		None
P5-8	19930623	0	3		479803.11	1350390.4	Thorium-232	1.5	pCi/g	0.79	NV	pCi/g		None
P5-9	19930624	0	0.5		479776.11	1350358.91	Thorium-232	1.5	pCi/g	0.93	NV	pCi/g		None
P5-9	19930624	0	1		479776.11	1350358.91	Thorium-232	1.5	pCi/g	0.96	NV	pCi/g		None
P5-9	19930624	0	3		479776.11	1350358.91	Thorium-232	1.5	pCi/g	0.81	NV	pCi/g		None
PUMP1-C-10-RS	19970309	0	0.33		479499	1350598	Thorium-232	1.5	pCi/g	1.05	-	pCi/g	Normal	None
PUMP1-C-10-RS	19970309	0	0.33		479499	1350598	Thorium-232	1.5	pCi/g	1.006	-	pCi/g	Normal	None
PUMP1-C-11-RS	19970309	0	0.33		479516	1350616	Thorium-232	1.5	pCi/g	1.272	-	pCi/g	Duplicate	None
PUMP1-C-11-RS	19970309	0	0.33		479516	1350616	Thorium-232	1.5	pCi/g	1.222	-	pCi/g	Normal	None
PUMP1-C-11-RS	19970309	0	0.33		479516	1350616	Thorium-232	1.5	pCi/g	1.148	-	pCi/g	Normal	None
PUMP1-C-11-RS	19970309	0	0.33		479516	1350616	Thorium-232	1.5	pCi/g	1.081	-	pCi/g	Duplicate	None
PUMP1-C-12-RS	19970309	0	0.33		479511	1350630	Thorium-232	1.5	pCi/g	1.09	-	pCi/g	Normal	None
PUMP1-C-12-RS	19970309	0	0.33		479511	1350630	Thorium-232	1.5	pCi/g	0.95	-	pCi/g	Normal	None
PUMP1-C-13-RS	19970309	0	0.33		479538	1350583	Thorium-232	1.5	pCi/g	1.205	-	pCi/g	Normal	None
PUMP1-C-13-RS	19970309	0	0.33		479538	1350583	Thorium-232	1.5	pCi/g	1.093	J	pCi/g	Normal	None
PUMP1-C-14-RS	19970309	0	0.33		479541	1350596	Thorium-232	1.5	pCi/g	1.23	-	pCi/g	Normal	None
PUMP1-C-14-RS	19970309	0	0.33		479541	1350596	Thorium-232	1.5	pCi/g	0.936	-	pCi/g	Normal	None
PUMP1-C-15-RS	19970309	0	0.33		479520	1350607	Thorium-232	1.5	pCi/g	1.213	-	pCi/g	Normal	None
PUMP1-C-15-RS	19970309	0	0.33		479520	1350607	Thorium-232	1.5	pCi/g	0.886	-	pCi/g	Normal	None
PUMP1-C-16-RS	19970309	0	0.33		479541	1350624	Thorium-232	1.5	pCi/g	1.361	-	pCi/g	Normal	None
PUMP1-C-16-RS	19970309	0	0.33		479541	1350624	Thorium-232	1.5	pCi/g	1.131	-	pCi/g	Normal	None
PUMP1-C-1-RS	19970307	0	0.33		479461	1350576	Thorium-232	1.5	pCi/g	1.654	-	pCi/g	Normal	None
PUMP1-C-1-RS	19970307	0	0.33		479461	1350576	Thorium-232	1.5	pCi/g	1.255	-	pCi/g	Normal	None
PUMP1-C-2-RS	19970307	0	0.33		479452	1350600	Thorium-232	1.5	pCi/g	1.221	-	pCi/g	Normal	None
PUMP1-C-2-RS	19970307	0	0.33		479452	1350600	Thorium-232	1.5	pCi/g	1.2	J	pCi/g	Normal	None
PUMP1-C-3-RS	19970307	0	0.33		479460	1350617	Thorium-232	1.5	pCi/g	1.274	-	pCi/g	Normal	None
PUMP1-C-3-RS	19970307	0	0.33		479460	1350617	Thorium-232	1.5	pCi/g	1.147	-	pCi/g	Normal	None
PUMP1-C-4-RS	19970307	0	0.33		479451	1350629	Thorium-232	1.5	pCi/g	1.333	-	pCi/g	Normal	None
PUMP1-C-4-RS	19970307	0	0.33		479451	1350629	Thorium-232	1.5	pCi/g	1.203	-	pCi/g	Normal	None
PUMP1-C-5-RS	19970307	0	0.33		479475	1350576	Thorium-232	1.5	pCi/g	1.491	-	pCi/g	Normal	None
PUMP1-C-5-RS	19970307	0	0.33		479475	1350576	Thorium-232	1.5	pCi/g	1.265	-	pCi/g	Normal	None
PUMP1-C-6-RS	19970307	0	0.33		479480	1350600	Thorium-232	1.5	pCi/g	1.369	-	pCi/g	Normal	None
PUMP1-C-6-RS	19970307	0	0.33		479480	1350600	Thorium-232	1.5	pCi/g	1.084	J	pCi/g	Normal	None
PUMP1-C-7-RS	19970309	0	0.33		479484	1350617	Thorium-232	1.5	pCi/g	1.185	-	pCi/g	Normal	None
PUMP1-C-7-RS	19970309	0	0.33		479484	1350617	Thorium-232	1.5	pCi/g	0.94	-	pCi/g	Normal	None
PUMP1-C-8-RS	19970309	0	0.33		479486	1350640	Thorium-232	1.5	pCi/g	1.255	-	pCi/g	Normal	None

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**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

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Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
PUMP1-C-8-RS	19970309	0	0.33		479486	1350640	Thorium-232	1.5	pCi/g	1.128	-	pCi/g	Normal	None
PUMP1-C-9-RS	19970309	0	0.33		479503	1350581	Thorium-232	1.5	pCi/g	1.044	-	pCi/g	Normal	None
PUMP1-C-9-RS	19970309	0	0.33		479503	1350581	Thorium-232	1.5	pCi/g	0.939	-	pCi/g	Normal	None
PUMP-C-11-RS	19970121	0.5	0.83		479514.05	1350619.22	Thorium-232	1.5	pCi/g	1.24	-	pCi/g	Normal	None
PUMP-C-11-RS	19970121	0.5	0.83		479514.05	1350619.22	Thorium-232	1.5	pCi/g	1	UJ	pCi/g	Normal	None
PUMP-C-13-RS	19970121	0.5	0.83		479521.05	1350576.25	Thorium-232	1.5	pCi/g	1.46	-	pCi/g	Normal	None
PUMP-C-13-RS	19970121	0.5	0.83		479521.05	1350576.25	Thorium-232	1.5	pCi/g	1.2	-	pCi/g	Normal	None
PUMP-C-14-RS	19970121	0.5	0.83		479533.05	1350588.05	Thorium-232	1.5	pCi/g	1.26	-	pCi/g	Normal	None
PUMP-C-14-RS	19970121	0.5	0.83		479533.05	1350588.05	Thorium-232	1.5	pCi/g	1.24	-	pCi/g	Normal	None
PUMP-C-15-RS	19970121	0.5	0.83		479535.14	1350616.14	Thorium-232	1.5	pCi/g	1.35	-	pCi/g	Normal	None
PUMP-C-15-RS	19970121	0.5	0.83		479535.14	1350616.14	Thorium-232	1.5	pCi/g	1.15	-	pCi/g	Normal	None
PUMP-C-16-RS	19970121	0.5	0.83		479522.09	1350638.16	Thorium-232	1.5	pCi/g	1.78	-	pCi/g	Normal	None
PUMP-C-16-RS	19970121	0.5	0.83		479522.09	1350638.16	Thorium-232	1.5	pCi/g	1.17	-	pCi/g	Normal	None
PUMP-C-2-RS	19970121	0.5	0.83		479467.08	1350591.09	Thorium-232	1.5	pCi/g	1.23	-	pCi/g	Normal	None
PUMP-C-2-RS	19970121	0.5	0.83		479467.08	1350591.09	Thorium-232	1.5	pCi/g	1.13	-	pCi/g	Normal	None
PUMP-C-3-RS	19970121	0.5	0.83		479469.12	1350620.67	Thorium-232	1.5	pCi/g	2.26	-	pCi/g	Normal	None
PUMP-C-3-RS	19970121	0.5	0.83		479469.12	1350620.67	Thorium-232	1.5	pCi/g	1.24	-	pCi/g	Normal	None
PUMP-C-4-RS	19970121	0.5	0.83		479458.1	1350624.69	Thorium-232	1.5	pCi/g	1.19	J	pCi/g	Normal	None
PUMP-C-4-RS	19970121	0.5	0.83		479458.1	1350624.69	Thorium-232	1.5	pCi/g	1.1	-	pCi/g	Normal	None
PUMP-C-5-RS	19970121	0.5	0.83		479476.98	1350586.2	Thorium-232	1.5	pCi/g	1.22	-	pCi/g	Normal	None
PUMP-C-5-RS	19970121	0.5	0.83		479476.98	1350586.2	Thorium-232	1.5	pCi/g	1.17	-	pCi/g	Normal	None
PUMP-C-6-RS	19970121	0.5	0.83		479486.38	1350601.33	Thorium-232	1.5	pCi/g	1.41	-	pCi/g	Normal	None
PUMP-C-6-RS	19970121	0.5	0.83		479486.38	1350601.33	Thorium-232	1.5	pCi/g	1.17	-	pCi/g	Normal	None
PUMP-C-7-RS	19970121	0.5	0.83		479488.18	1350605.39	Thorium-232	1.5	pCi/g	1.55	-	pCi/g	Normal	None
PUMP-C-7-RS	19970121	0.5	0.83		479488.18	1350605.39	Thorium-232	1.5	pCi/g	1.03	-	pCi/g	Normal	None
PUMP-C-9-RS	19970121	0.5	0.83		479503.02	1350577.22	Thorium-232	1.5	pCi/g	1.33	-	pCi/g	Normal	None
PUMP-C-9-RS	19970121	0.5	0.83		479503.02	1350577.22	Thorium-232	1.5	pCi/g	1.02	-	pCi/g	Normal	None
ZONE 1-10	19881027	0	0.5		479529.382	1349280.998	Thorium-232	1.5	pCi/g	0.8	-	pCi/g	Normal	None
ZONE 1-51	19880622	0	0.5		479754.393	1349950.993	Thorium-232	1.5	pCi/g	1.7	J	pCi/g	Normal	None
ZONE 1-51	19880622	0.5	1		479754.393	1349950.993	Thorium-232	1.5	pCi/g	1	-	pCi/g	Normal	None
ZONE 1-51	19880622	1	1.5		479754.393	1349950.993	Thorium-232	1.5	pCi/g	1.2	-	pCi/g	Normal	None
ZONE 1-52	19880927	0	0.5		479754.393	1349990.993	Thorium-232	1.5	pCi/g	1	-	pCi/g	Normal	None
ZONE 1-54	19881027	0	0.5		479779.391	1349800.993	Thorium-232	1.5	pCi/g	0.7	J	pCi/g	Normal	None
ZONE 1-54	19881027	0.5	1		479779.391	1349800.993	Thorium-232	1.5	pCi/g	0.8	NV	pCi/g	Normal	None
ZONE 1-54	19881027	1	1.5		479779.391	1349800.993	Thorium-232	1.5	pCi/g	0.6	NV	pCi/g	Normal	None
ZONE 1-81	19880927	0	0.5		479979.393	1349775.991	Thorium-232	1.5	pCi/g	0.9	-	pCi/g	Normal	None
ZONE 2-115	19880929	0	0.5		479779.4	1350530.991	Thorium-232	1.5	pCi/g	0.8	-	pCi/g	Normal	None
ZONE 2-116	19881004	0	0.5		479779.403	1350780.99	Thorium-232	1.5	pCi/g	0.9	-	pCi/g	Normal	None
ZONE 2-145	19880929	0	0.5		480029.402	1350530.988	Thorium-232	1.5	pCi/g	0.8	-	pCi/g	Normal	None
ZONE 2-81	19881027	0	0.5		479529.392	1350030.995	Thorium-232	1.5	pCi/g	0.7	J	pCi/g	Normal	None
ZONE 2-84	19881027	0	0.5		479529.395	1350280.994	Thorium-232	1.5	pCi/g	0.7	J	pCi/g	Normal	None

**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
ZONE 2-87	19880929	0	0.5		479529.398	1350530.994	Thorium-232	1.5	pCi/g	0.8	-	pCi/g	Normal	None
ZONE 2-90	19881004	0	0.5		479529.401	1350780.993	Thorium-232	1.5	pCi/g	0.9	-	pCi/g	Normal	None
ZONE 3-43	19881010	0	0.5		479279.395	1350530.997	Thorium-232	1.5	pCi/g	0.6	U	pCi/g	Normal	None
ZONE 3-44	19881010	0	0.5		479279.398	1350780.996	Thorium-232	1.5	pCi/g	0.9	-	pCi/g	Normal	None
ZONE 3-71	19881027	0	0.5		479529.386	1349530.997	Thorium-232	1.5	pCi/g	0.6	UJ	pCi/g	Normal	None
11075	19930621	0	0.5		479784.746	1350182.532	Uranium, Total	50	mg/kg	279	NV	mg/kg	Normal	None
11075	19930621	2	2.5		479784.746	1350182.532	Uranium, Total	50	mg/kg	64	NV	mg/kg	Normal	None
11075	19930621	5	5.5		479784.746	1350182.532	Uranium, Total	50	mg/kg	11	NV	mg/kg	Normal	None
11075	19930621	10	10.5		479784.746	1350182.532	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
11108	19930724	0	0.5	580.2	479873.665	1350027.391	Uranium, Total	50	mg/kg	32.28	J	mg/kg	Normal	None
11108	19930724	1	1.5	580.2	479873.665	1350027.391	Uranium, Total	50	mg/kg	1.199	J	mg/kg	Normal	None
11108	19930724	2.5	3	580.2	479873.665	1350027.391	Uranium, Total	50	mg/kg	1.799	J	mg/kg	Normal	None
11108	19930726	7.5	8.5	580.2	479873.665	1350027.391	Uranium, Total	50	mg/kg	0.7	-	mg/kg	Normal	None
11108	19930725	9	10	580.2	479873.665	1350027.391	Uranium, Total	50	mg/kg	2.099	J	mg/kg	Normal	None
11109	19930724	0	0.5	578.1	479750.119	1349623.424	Uranium, Total	50	mg/kg	41.7	-	mg/kg	Normal	None
11109	19930724	0	0.5	578.1	479750.13	1349623.49	Uranium, Total	50	mg/kg	5.8	-	ug/g	Duplicate	None
11109	19930724	1	1.5	578.1	479750.119	1349623.424	Uranium, Total	50	mg/kg	9.915	J	mg/kg	Normal	None
11109	19930724	2.5	3	578.1	479750.119	1349623.424	Uranium, Total	50	mg/kg	8.096	J	mg/kg	Normal	None
11109	19930724	6	6.5	578.1	479750.119	1349623.424	Uranium, Total	50	mg/kg	2.099	J	mg/kg	Normal	None
11109	19930724	9	9.5	578.1	479750.119	1349623.424	Uranium, Total	50	mg/kg	3.2	-	mg/kg	Normal	None
1111	19881202	0	1.5		480225.563	1350409.046	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
1111	19881202	1.5	3		480225.563	1350409.046	Uranium, Total	50	mg/kg	17	NV	mg/kg	Normal	None
1111	19881202	4.5	6		480225.563	1350409.046	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
1111	19881203	9	10.5		480225.563	1350409.046	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
11110	19930727	0	0.5	578.7	479770.742	1349911.203	Uranium, Total	50	mg/kg	165.8	J	mg/kg	Normal	None
11110	19930727	1	1.5	578.7	479770.742	1349911.203	Uranium, Total	50	mg/kg	46.66	J	mg/kg	Normal	None
11110	19930727	2.5	3	578.7	479770.742	1349911.203	Uranium, Total	50	mg/kg	26.58	J	mg/kg	Normal	None
11110	19930727	6	7	578.7	479770.742	1349911.203	Uranium, Total	50	mg/kg	21.59	J	mg/kg	Normal	None
11110	19930727	9	10	578.7	479770.742	1349911.203	Uranium, Total	50	mg/kg	2.999	J	mg/kg	Normal	None
1112	19881118	0	1.5		480020.918	1350194.139	Uranium, Total	50	mg/kg	52	NV	mg/kg	Normal	None
1112	19881118	1.5	3		480020.918	1350194.139	Uranium, Total	50	mg/kg	26	NV	mg/kg	Normal	None
1112	19881118	4.5	6		480020.918	1350194.139	Uranium, Total	50	mg/kg	32	NV	mg/kg	Normal	None
1112	19881118	9	10.5		480020.918	1350194.139	Uranium, Total	50	mg/kg	12	NV	mg/kg	Normal	None
1112	19881118	15	16.5		480020.918	1350194.139	Uranium, Total	50	mg/kg	11	NV	mg/kg	Normal	None
1113	19881201	0	1.5		480022.095	1349934.25	Uranium, Total	50	mg/kg	158	NV	mg/kg	Normal	None
1113	19881201	1.5	3		480022.095	1349934.25	Uranium, Total	50	mg/kg	82	NV	mg/kg	Normal	None
1113	19881201	4.5	6		480022.095	1349934.25	Uranium, Total	50	mg/kg	85	NV	mg/kg	Normal	None
1113	19881201	9	10.5		480022.095	1349934.25	Uranium, Total	50	mg/kg	28	NV	mg/kg	Normal	None
1113	19881202	15	16.5		480022.095	1349934.25	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
1160	19890404	0	0.5		480212.656	1350635.495	Uranium, Total	50	mg/kg	24	NV	mg/kg	Normal	None
1160	19890404	2	2.5		480212.656	1350635.495	Uranium, Total	50	mg/kg	16	NV	mg/kg	Normal	None

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**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

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Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing_83	Easting_83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
1160	19890404	5	5.5		480212.656	1350635.495	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
1168	19890502	0	0.5	578.8	480035.59	1349482.111	Uranium, Total	50	mg/kg	120.6	-	mg/kg	Normal	None
1168	19890502	2	2.5	578.8	480035.59	1349482.111	Uranium, Total	50	mg/kg	11	NV	mg/kg	Normal	None
1168	19890502	5	5.5	578.8	480035.59	1349482.111	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
1168	19890502	10.5	11	578.8	480035.59	1349482.111	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
1168	19890502	15	15.5	578.8	480035.59	1349482.111	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
11686	19950428				480124.05	1350695.4	Uranium, Total	50	mg/kg	0.1	UNV	ppm	Normal	None
1169	19890412	0	0.5	579.3	480036.893	1349716.01	Uranium, Total	50	mg/kg	119	J	mg/kg	Normal	None
1169	19890413	2	2.5	579.3	480036.893	1349716.01	Uranium, Total	50	mg/kg	35	NV	mg/kg	Normal	None
1169	19890413	5	5.5	579.3	480036.893	1349716.01	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
1169	19890413	10	10.5	579.3	480036.893	1349716.01	Uranium, Total	50	mg/kg	29	NV	mg/kg	Normal	None
1169	19890413	15	15.5	579.3	480036.893	1349716.01	Uranium, Total	50	mg/kg	68	NV	mg/kg	Normal	None
1170	19890510	0	0.5	579.3	479976.25	1350401.759	Uranium, Total	50	mg/kg	17	NV	mg/kg	Normal	None
1170	19890510	2	2.5	579.3	479976.25	1350401.759	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
1170	19890510	5	5.5	579.3	479976.25	1350401.759	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
1170	19890510	10	10.5	579.3	479976.25	1350401.759	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
1170	19890510	15	15.5	579.3	479976.25	1350401.759	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
1171	19890403	0	0.5		479971.113	1350601.568	Uranium, Total	50	mg/kg	11	NV	mg/kg	Normal	None
1171	19890403	2	2.5		479971.113	1350601.568	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
1171	19890403	5	5.5		479971.113	1350601.568	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
1173	19890330	0	0.5		479780.643	1349925.453	Uranium, Total	50	mg/kg	91	NV	mg/kg	Normal	None
1173	19890330	2	2.5		479780.643	1349925.453	Uranium, Total	50	mg/kg	71	NV	mg/kg	Normal	None
1173	19890330	5	5.5		479780.643	1349925.453	Uranium, Total	50	mg/kg	23	NV	mg/kg	Normal	None
1173	19890330	10	10.5		479780.643	1349925.453	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
1173	19890401	16.5	18		479780.643	1349925.453	Uranium, Total	50	mg/kg	17	NV	mg/kg	Normal	None
1174	19890403	0	0.5		479786.286	1350167.882	Uranium, Total	50	mg/kg	373.6	-	mg/kg	Normal	None
1174	19890403	2	2.5		479786.286	1350167.882	Uranium, Total	50	mg/kg	78	NV	mg/kg	Normal	None
1174	19890403	5	5.5		479786.286	1350167.882	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
1174	19890403	10	10.5		479786.286	1350167.882	Uranium, Total	50	mg/kg	15	NV	mg/kg	Normal	None
1175	19890329	0	0.5	577.5	479770.609	1350424.871	Uranium, Total	50	mg/kg	14	NV	mg/kg	Normal	None
1175	19890329	2	2.5	577.5	479770.609	1350424.871	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
1175	19890329	5	5.5	577.5	479770.609	1350424.871	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
1175	19890330	10	10.5	577.5	479770.609	1350424.871	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
1175	19890330	15	15.5	577.5	479770.609	1350424.871	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
1840	19920808	0	0.5	579.1	479994.286	1349189.832	Uranium, Total	50	mg/kg	23	NV	mg/kg	Normal	None
1840	19920808	2	2.5	579.1	479994.286	1349189.832	Uranium, Total	50	mg/kg	30	NV	mg/kg	Normal	None
1840	19920808	5	5.5	579.1	479994.286	1349189.832	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
1840	19920808	10.5	11.5	579.1	479994.286	1349189.832	Uranium, Total	50	mg/kg	23.78	J	mg/kg	Normal	None
1840	19920808	12	12.5	579.1	479994.28	1349189.83	Uranium, Total	50	mg/kg	11	UNV	ug/g	Split	None
1840	19920808	13.5	14.5	579.1	479994.286	1349189.832	Uranium, Total	50	mg/kg	4.138	J	mg/kg	Normal	None
1840	19920809			579.1	479994.28	1349189.83	Uranium, Total	50	mg/kg	12	NV	ug/g	Drill Cuttings	None

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**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
1841	19920617	0	0.5	579.3	479982.581	1349617.751	Uranium, Total	50	mg/kg	14	NV	mg/kg	Normal	None
1841	19920617	3	3.5	579.3	479982.581	1349617.751	Uranium, Total	50	mg/kg	16	NV	mg/kg	Normal	None
1841	19920617	5	5.5	579.3	479982.581	1349617.751	Uranium, Total	50	mg/kg	15	NV	mg/kg	Normal	None
1841	19920617	9.5	10.5	579.3	479982.581	1349617.751	Uranium, Total	50	mg/kg	4.43	-	mg/kg	Normal	None
1841	19920617	10.5	11	579.3	479982.581	1349617.751	Uranium, Total	50	mg/kg	15	NV	mg/kg	Normal	None
1841	19920619	11.5	12.5	579.3	479982.581	1349617.751	Uranium, Total	50	mg/kg	9.9	-	mg/kg	Normal	None
1841	19920622	15.5	16	579.3	479982.581	1349617.751	Uranium, Total	50	mg/kg	11	NV	mg/kg	Normal	None
1841	19920623			579.3	479982.58	1349617.75	Uranium, Total	50	mg/kg	16	NV	ug/g	Drill Cuttings	None
1841	19920623			579.3	479982.58	1349617.75	Uranium, Total	50	mg/kg	13	NV	ug/g	Drill Cuttings	None
1841	19920623			579.3	479982.58	1349617.75	Uranium, Total	50	mg/kg	11	J	ug/g	Drill Cuttings	None
1841	19920623			579.3	479982.58	1349617.75	Uranium, Total	50	mg/kg	5.85	J	ug/g	Drill Cuttings	None
1842	19920615	0	0.5		479956.651	1350503.909	Uranium, Total	50	mg/kg	25	NV	mg/kg	Normal	None
1842	19920615	2	2.5		479956.651	1350503.909	Uranium, Total	50	mg/kg	13	NV	mg/kg	Normal	None
1842	19920615	5	5.5		479956.651	1350503.909	Uranium, Total	50	mg/kg	14	NV	mg/kg	Normal	None
1842	19920616	8	9		479956.651	1350503.909	Uranium, Total	50	mg/kg	7.706	J	mg/kg	Normal	None
1842	19920616	9.5	10		479956.651	1350503.909	Uranium, Total	50	mg/kg	11	UNV	mg/kg	Normal	None
1842	19921209	10	10.5		479956.651	1350503.909	Uranium, Total	50	mg/kg	3.05	UJ	mg/kg	Normal	None
1842	19921209	10.5	11.5		479956.651	1350503.909	Uranium, Total	50	mg/kg	3.328	-	mg/kg	Normal	None
1842	19921209	15	15.5		479956.651	1350503.909	Uranium, Total	50	mg/kg	4.22	-	mg/kg	Normal	None
1842	19920616				479956.65	1350503.9	Uranium, Total	50	mg/kg	12	NV	ug/g	Drill Cuttings	None
1842	19921215				479956.65	1350503.9	Uranium, Total	50	mg/kg	11	UNV	ug/g	Drill Cuttings	None
1842	19920616				479956.65	1350503.9	Uranium, Total	50	mg/kg	7.95	-	ug/g	Drill Cuttings	None
1866	19921218	0	0.5	576.8	479517.363	1350173.445	Uranium, Total	50	mg/kg	64.13	-	mg/kg	Normal	None
1866	19921218	2	2.5	576.8	479517.363	1350173.445	Uranium, Total	50	mg/kg	14.4	-	mg/kg	Normal	None
1866	19921218	5	5.5	576.8	479517.363	1350173.445	Uranium, Total	50	mg/kg	11	-	mg/kg	Normal	None
1866	19921218	10	10.5	576.8	479517.363	1350173.445	Uranium, Total	50	mg/kg	12.7	-	mg/kg	Normal	None
1867	19921219	0	0.5	576.6	479527.268	1349724.366	Uranium, Total	50	mg/kg	13.88	-	mg/kg	Normal	None
1867	19921219	2	2.5	576.6	479527.268	1349724.366	Uranium, Total	50	mg/kg	8.07	-	mg/kg	Normal	None
1867	19921219	5	5.5	576.6	479527.268	1349724.366	Uranium, Total	50	mg/kg	10.8	-	mg/kg	Normal	None
1867	19921219	10	10.5	576.6	479527.268	1349724.366	Uranium, Total	50	mg/kg	9.58	-	mg/kg	Normal	None
1867	19921219	15	15.5	576.6	479527.268	1349724.366	Uranium, Total	50	mg/kg	11.1	-	mg/kg	Normal	None
1868	19921219	0	0.5	575.7	479546.332	1349222.008	Uranium, Total	50	mg/kg	21.32	-	mg/kg	Normal	None
1868	19921219	2	2.5	575.7	479546.332	1349222.008	Uranium, Total	50	mg/kg	14.2	-	mg/kg	Normal	None
1868	19921219	5	5.5	575.7	479546.332	1349222.008	Uranium, Total	50	mg/kg	12.3	-	mg/kg	Normal	None
1868	19921219	10	10.5	575.7	479546.332	1349222.008	Uranium, Total	50	mg/kg	10.6	-	mg/kg	Normal	None
1868	19921219	15	15.5	575.7	479546.332	1349222.008	Uranium, Total	50	mg/kg	13.5	-	mg/kg	Normal	None
1869	19930106	0	0.5		479725.517	1349472.755	Uranium, Total	50	mg/kg	37.1	J	mg/kg	Normal	None
1869	19930106	2	2.5		479725.517	1349472.755	Uranium, Total	50	mg/kg	5.91	-	mg/kg	Normal	None
1869	19930106	5	5.5		479725.517	1349472.755	Uranium, Total	50	mg/kg	7.77	-	mg/kg	Normal	None
1869	19930106	10	10.5		479725.517	1349472.755	Uranium, Total	50	mg/kg	3.09	-	mg/kg	Normal	None
2118	19881207	12	13.5	579	480042.54	1350326.858	Uranium, Total	50	mg/kg	3.598	-	mg/kg	Normal	None

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**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

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Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
2118	19881208	35	36.5	579	480042.54	1350326.858	Uranium, Total	50	mg/kg	1.799	U	mg/kg	Normal	None
3068	19880120	0	1.5	578.18	478701.592	1349923.565	Uranium, Total	50	mg/kg	31.48	J	mg/kg	Normal	None
3068	19880122	50	51.5	578.18	478701.592	1349923.565	Uranium, Total	50	mg/kg	1.799	U	mg/kg	Normal	None
3068	19880124	115	116.5	578.18	478701.592	1349923.565	Uranium, Total	50	mg/kg	1.799	U	mg/kg	Normal	None
3120	19900118	1.5	3	581.9	480196.635	1350626.186	Uranium, Total	50	mg/kg	22.79	-	mg/kg	Normal	None
3120	19900122	45	46.5	581.9	480196.635	1350626.186	Uranium, Total	50	mg/kg	1.799	U	mg/kg	Normal	None
3120	19900124	115	116.5	581.9	480196.635	1350626.186	Uranium, Total	50	mg/kg	4.198	-	mg/kg	Normal	None
A5-CH-1	20010906	0	0.5		478863.05	1350182.24	Uranium, Total	50	mg/kg	5.438	J	ug/g	Normal	None
A5-CH-1	20010906	2	2.5		478863.05	1350182.24	Uranium, Total	50	mg/kg	4.819	J	ug/g	Normal	None
A5-CH-1	20010906	4	4.5		478863.05	1350182.24	Uranium, Total	50	mg/kg	3.177	J	ug/g	Normal	None
A5-CH-2	20010906	0	0.5		478862.33	1350204.62	Uranium, Total	50	mg/kg	5.206	J	ug/g	Normal	None
A5-CH-2	20010906	2	2.5		478862.33	1350204.62	Uranium, Total	50	mg/kg	3.085	J	ug/g	Normal	None
A5-CH-2	20010906	4	4.5		478862.33	1350204.62	Uranium, Total	50	mg/kg	2.82	UJ	ug/g	Normal	None
A5-CH-3	20010906	0	0.5		478844.46	1350204.5	Uranium, Total	50	mg/kg	9.772	J	ug/g	Normal	None
A5-CH-3	20010906	2	2.5		478844.46	1350204.5	Uranium, Total	50	mg/kg	2.974	J	ug/g	Normal	None
A5-CH-3	20010906	4	4.5		478844.46	1350204.5	Uranium, Total	50	mg/kg	3.289	UJ	ug/g	Normal	None
A5-CH-4	20010906	0	0.5		478845.11	1350181.52	Uranium, Total	50	mg/kg	13.51	J	ug/g	Normal	None
A5-CH-4	20010906	2	2.5		478845.11	1350181.52	Uranium, Total	50	mg/kg	2.499	UJ	ug/g	Normal	None
A5-CH-4	20010906	4	4.5		478845.11	1350181.52	Uranium, Total	50	mg/kg	3.26	UJ	ug/g	Normal	None
ESA-2	19930127	0	0.5	577.6	479884.269	1350352.05	Uranium, Total	50	mg/kg	10.79	NV	mg/kg	Normal	None
ESA-5	19930127	0	0.5	577.6	479840.508	1350350.501	Uranium, Total	50	mg/kg	16.52	NV	mg/kg	Normal	None
ESA-8	19930128	0	0.5	577.7	479762.478	1350348.582	Uranium, Total	50	mg/kg	20.78	NV	mg/kg	Normal	None
P23-1		0	0		479746.34	1349783.85	Uranium, Total	50	mg/kg	47	NV	mg/kg		None
P23-1		0	1		479746.34	1349783.85	Uranium, Total	50	mg/kg	48	NV	mg/kg		None
P23-2		0	0		479892.81	1349790.71	Uranium, Total	50	mg/kg	22	NV	mg/kg		None
P23-2		0	1		479892.81	1349790.71	Uranium, Total	50	mg/kg	14	NV	mg/kg		None
P23-3		0	0		479949.51	1349794.35	Uranium, Total	50	mg/kg	65	NV	mg/kg		None
P23-3		0	1		479949.51	1349794.35	Uranium, Total	50	mg/kg	62	NV	mg/kg		None
P23-4		0	0		479980.81	1349835.63	Uranium, Total	50	mg/kg	190	NV	mg/kg		None
P23-4		0	1		479980.81	1349835.63	Uranium, Total	50	mg/kg	63	NV	mg/kg		None
P23-5		0	0		480039.49	1349846.07	Uranium, Total	50	mg/kg	98	NV	mg/kg		None
P23-5		0	1		480039.49	1349846.07	Uranium, Total	50	mg/kg	95	NV	mg/kg		None
P23-8		0	0		480038.9	1349998.26	Uranium, Total	50	mg/kg	40	NV	mg/kg		None
P23-8		0	1		480038.9	1349998.26	Uranium, Total	50	mg/kg	278	NV	mg/kg		None
P23-9		0	0		480018.23	1349987.42	Uranium, Total	50	mg/kg	86	NV	mg/kg		None
P23-9		0	1		480018.23	1349987.42	Uranium, Total	50	mg/kg	75	NV	mg/kg		None
P27-SP1	19910929	0	0.5		479610.54	1350230.92	Uranium, Total	50	mg/kg	42	NV	mg/kg		None
P27-SP1	19910929		1		479610.54	1350230.92	Uranium, Total	50	mg/kg	21	NV	mg/kg		None
P27-SP2	19910929	0	0.5		479634.16	1350211.6	Uranium, Total	50	mg/kg	70	NV	mg/kg		None
P27-SP2	19910929		1		479634.16	1350211.6	Uranium, Total	50	mg/kg	46	NV	mg/kg		None
P27-SP3	19910929	0	0.5		479625.89	1350259.08	Uranium, Total	50	mg/kg	75	NV	mg/kg		None

**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
P27-SP3	19910929		1		479625.89	1350259.08	Uranium, Total	50	mg/kg	42	NV	mg/kg		None
P27-SP4	19910929	0	0.5		479624.12	1350318.61	Uranium, Total	50	mg/kg	15	NV	mg/kg		None
P27-SP4	19910929		1		479624.12	1350318.61	Uranium, Total	50	mg/kg	13	NV	mg/kg		None
PUMP1-C-10-RS	19970309	0	0.33		479499	1350598	Uranium, Total	50	mg/kg	3.541	-	ug/g	Normal	None
PUMP1-C-11-RS	19970309	0	0.33		479516	1350616	Uranium, Total	50	mg/kg	11.88	-	ug/g	Normal	None
PUMP1-C-11-RS	19970309	0	0.33		479516	1350616	Uranium, Total	50	mg/kg	9.095	-	ug/g	Duplicate	None
PUMP1-C-12-RS	19970309	0	0.33		479511	1350630	Uranium, Total	50	mg/kg	8.015	-	ug/g	Normal	None
PUMP1-C-13-RS	19970309	0	0.33		479538	1350583	Uranium, Total	50	mg/kg	8.81	-	ug/g	Normal	None
PUMP1-C-14-RS	19970309	0	0.33		479541	1350596	Uranium, Total	50	mg/kg	3.631	J	ug/g	Normal	None
PUMP1-C-15-RS	19970309	0	0.33		479520	1350607	Uranium, Total	50	mg/kg	6.054	-	ug/g	Normal	None
PUMP1-C-16-RS	19970309	0	0.33		479541	1350624	Uranium, Total	50	mg/kg	6.51	-	ug/g	Normal	None
PUMP1-C-1-RS	19970307	0	0.33		479461	1350576	Uranium, Total	50	mg/kg	7.808	-	ug/g	Normal	None
PUMP1-C-2-RS	19970307	0	0.33		479452	1350600	Uranium, Total	50	mg/kg	15	-	ug/g	Normal	None
PUMP1-C-3-RS	19970307	0	0.33		479460	1350617	Uranium, Total	50	mg/kg	9.52	-	ug/g	Normal	None
PUMP1-C-4-RS	19970307	0	0.33		479451	1350629	Uranium, Total	50	mg/kg	8.492	-	ug/g	Normal	None
PUMP1-C-5-RS	19970307	0	0.33		479475	1350576	Uranium, Total	50	mg/kg	7.922	-	ug/g	Normal	None
PUMP1-C-6-RS	19970307	0	0.33		479480	1350600	Uranium, Total	50	mg/kg	3.724	J	ug/g	Normal	None
PUMP1-C-7-RS	19970309	0	0.33		479484	1350617	Uranium, Total	50	mg/kg	6.873	-	ug/g	Normal	None
PUMP1-C-8-RS	19970309	0	0.33		479486	1350640	Uranium, Total	50	mg/kg	6.102	J	ug/g	Normal	None
PUMP1-C-9-RS	19970309	0	0.33		479503	1350581	Uranium, Total	50	mg/kg	10.49	-	ug/g	Normal	None
PUMP-C-11-RS	19970121	0.5	0.83		479514.05	1350619.22	Uranium, Total	50	mg/kg	17.39	U	ug/g	Normal	None
PUMP-C-13-RS	19970121	0.5	0.83		479521.05	1350576.25	Uranium, Total	50	mg/kg	12.89	U	ug/g	Normal	None
PUMP-C-14-RS	19970121	0.5	0.83		479533.05	1350588.05	Uranium, Total	50	mg/kg	15.29	U	ug/g	Normal	None
PUMP-C-15-RS	19970121	0.5	0.83		479535.14	1350616.14	Uranium, Total	50	mg/kg	27.02	-	ug/g	Normal	None
PUMP-C-16-RS	19970121	0.5	0.83		479522.09	1350638.16	Uranium, Total	50	mg/kg	21.83	-	ug/g	Normal	None
PUMP-C-2-RS	19970121	0.5	0.83		479467.08	1350591.09	Uranium, Total	50	mg/kg	12.89	U	ug/g	Normal	None
PUMP-C-3-RS	19970121	0.5	0.83		479469.12	1350620.67	Uranium, Total	50	mg/kg	19.28	J	ug/g	Normal	None
PUMP-C-4-RS	19970121	0.5	0.83		479458.1	1350624.69	Uranium, Total	50	mg/kg	15.89	U	ug/g	Normal	None
PUMP-C-5-RS	19970121	0.5	0.83		479476.98	1350586.2	Uranium, Total	50	mg/kg	12.29	U	ug/g	Normal	None
PUMP-C-6-RS	19970121	0.5	0.83		479486.38	1350601.33	Uranium, Total	50	mg/kg	12.59	J	ug/g	Normal	None
PUMP-C-7-RS	19970121	0.5	0.83		479488.18	1350605.39	Uranium, Total	50	mg/kg	16.46	J	ug/g	Normal	None
PUMP-C-9-RS	19970121	0.5	0.83		479503.02	1350577.22	Uranium, Total	50	mg/kg	12.89	U	ug/g	Normal	None
ZONE 1-10	19881027	0	0.5		479529.382	1349280.998	Uranium, Total	50	mg/kg	54.88	-	mg/kg	Normal	None
ZONE 1-51	19880622	0	0.5		479754.393	1349950.993	Uranium, Total	50	mg/kg	156.6	-	mg/kg	Normal	None
ZONE 1-51	19880622	0.5	1		479754.393	1349950.993	Uranium, Total	50	mg/kg	77.99	-	mg/kg	Normal	None
ZONE 1-51	19880622	1	1.5		479754.393	1349950.993	Uranium, Total	50	mg/kg	42.88	-	mg/kg	Normal	None
ZONE 1-52	19880927	0	0.5		479754.393	1349990.993	Uranium, Total	50	mg/kg	89.94	-	mg/kg	Normal	None
ZONE 1-54	19881027	0	0.5		479779.391	1349800.993	Uranium, Total	50	mg/kg	125	J	mg/kg	Normal	None
ZONE 1-54	19881027	0.5	1		479779.391	1349800.993	Uranium, Total	50	mg/kg	22.19	NV	mg/kg	Normal	None
ZONE 1-54	19881027	1	1.5		479779.391	1349800.993	Uranium, Total	50	mg/kg	11.69	NV	mg/kg	Normal	None
ZONE 1-81	19880927	0	0.5		479979.393	1349775.991	Uranium, Total	50	mg/kg	78.7	-	mg/kg	Normal	None

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**APPENDIX A
AREA 5 HISTORICAL ASCOC DATA**

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Location ID	Sample Date	Top Depth	Bottom Depth	Ground MSL	Northing 83	Easting 83	Parameter	FRL	Unit	Result	Qualifier	Unit	QA Type	Prep ID
ZONE 2-115	19880929	0	0.5		479779.4	1350530.991	Uranium, Total	50	mg/kg	19.19	-	mg/kg	Normal	None
ZONE 2-116	19881004	0	0.5		479779.403	1350780.99	Uranium, Total	50	mg/kg	24.29	-	mg/kg	Normal	None
ZONE 2-145	19880929	0	0.5		480029.402	1350530.988	Uranium, Total	50	mg/kg	32.98	-	mg/kg	Normal	None
ZONE 2-147	19881004	0	0.5		480029.406	1350780.987	Uranium, Total	50	mg/kg	45.36	-	mg/kg	Normal	None
ZONE 2-81	19881027	0	0.5		479529.392	1350030.995	Uranium, Total	50	mg/kg	13.19	-	mg/kg	Normal	None
ZONE 2-84	19881027	0	0.5		479529.395	1350280.994	Uranium, Total	50	mg/kg	47.35	-	mg/kg	Normal	None
ZONE 2-87	19880929	0	0.5		479529.398	1350530.994	Uranium, Total	50	mg/kg	16.19	-	mg/kg	Normal	None
ZONE 2-90	19881004	0	0.5		479529.401	1350780.993	Uranium, Total	50	mg/kg	29.99	-	mg/kg	Normal	None
ZONE 3-43	19881010	0	0.5		479279.395	1350530.997	Uranium, Total	50	mg/kg	7.796	-	mg/kg	Normal	None
ZONE 3-44	19881010	0	0.5		479279.398	1350780.996	Uranium, Total	50	mg/kg	2.699	-	mg/kg	Normal	None
ZONE 3-71	19881027	0	0.5		479529.386	1349530.997	Uranium, Total	50	mg/kg	16.79	-	mg/kg	Normal	None

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APPENDIX B

**DATA QUALITY OBJECTIVES
SL-048, REV. 5 AND SL-049, REV. 1**

Fernald Environmental Management Project**Data Quality Objectives**

Title: Delineating the Extent of Constituents of
Concern During Remediation Sampling

Number: SL-048

Revision: 5

Effective Date: February 26, 1999

Contact Name: Eric Kroger

Approval: (signature on file) **Date:** 2/25/99

James E. Chambers
DQO Coordinator

Approval: (signature on file) **Date:** 2/26/99

J.D. Chiou
SCEP Project Director

Rev. #	0	1	2	3	4	5	6
Effective Date:	9/19/97	10/3/97	4/15/98	6/17/98	7/14/98	2/26/99	

DATA QUALITY OBJECTIVES

Delineating the Extent of Constituents of Concern During Remediation Sampling

Members of Data Quality Objectives (DQO) Scoping Team

The members of the DQO team include a project lead, a project engineer, a field lead, a statistician, a lead chemist, a sampling supervisor, and a data management lead.

Conceptual Model of the Site

Media is considered contaminated if the concentration of a constituent of concern (COC) exceeds the final remediation levels (FRLs). The extent of specific media contamination was estimated and published in the Operable Unit 5 Feasibility Study (FS). These estimates were based on kriging analysis of available data for media collected during the Remedial Investigation (RI) effort and other FEMP environmental characterization studies. Maps outlining contaminated media boundaries were generated for the Operable Unit 5 FS by overlaying the results of the kriging analysis data with isoconcentration maps of the other constituents of concern (COCs), as presented in the Operable Unit 5 RI report, and further modified by spatial analysis of maps reflecting the most current media characterization data. A sequential remediation plan has been presented that subdivides the FEMP into seven construction areas. During the course of remediation, areas of specific media may require additional characterization so remediation can be carried out as thoroughly and efficiently as possible. As a result, additional sampling may be necessary to accurately delineate a volume of specific media as exceeding a target level, such as the FRL or the Waste Attainment Criterion (WAC). Each individual Project-Specific Plan (PSP) will identify and describe the particular media to be sampled. This DQO covers all physical sampling activities associated with Pre-design Investigations, precertification sampling, WAC attainment sampling or regulatory monitoring that is required during site remediation.

1.0 Statement of Problem

If the extent (depth and/or area) of the media COC contamination is unknown, then it must be defined with respect to the appropriate target level (FRL, WAC, or other specified media concentration).

2.0 Identify the Decision

Delineate the horizontal and/or vertical extent of media COC contamination in an area with respect to the appropriate target level.

3.0 Inputs That Affect the Decision

Informational Inputs - Historical data, process history knowledge, the modeled extent of COC contamination, and the origins of contamination will be required to

establish a sampling plan to delineate the extent of COC contamination. The desired precision of the delineation must be weighed against the cost of collecting and analyzing additional samples in order to determine the optimal sampling density. The project-specific plan will identify the optimal sampling density.

Action Levels - COCs must be delineated with respect to a specific action level, such as FRLs and On-Site Disposal Facility (OSDF) WAC concentrations. Specific media FRLs are established in the OU2 and OU5 RODs, and the WAC concentrations are published in the OU5 ROD. Media COCs may also require delineation with respect to other action levels that act as remediation drivers, such as Benchmark Toxicity Values (BTVs).

4.0 The Boundaries of the Situation

Temporal Boundaries - Sampling must be completed within a time frame sufficient to meet the remediation schedule. Time frames must allow for the scheduling of sampling and analytical activities, the collection of samples, analysis of samples and the processing of analytical data when received.

Scale of Decision Making - The decision made based upon the data collected in this investigation will be the extent of COC contamination at or above the appropriate action level. This delineation will result in media contaminant concentration information being incorporated into engineering design, and the attainment of established remediation goals.

Parameters of Interest - The parameters of interest are the COCs that have been determined to require additional delineation before remediation design can be finalized with the optimal degree of accuracy.

5.0 Decision Rule

If existing data provide an unacceptable level of uncertainty in the COC delineation model, then additional sampling will take place to decrease the model uncertainty. When deciding what additional data is needed, the costs of additional sampling and analysis must be weighed against the benefit of reduced uncertainty in the delineation model, which will eventually be used for assigning excavation, or for other purposes.

6.0 Limits on Decision Errors

In order to be useful, data must be collected with sufficient areal and depth coverage, and at sufficient density to ensure an accurate delineation of COC concentrations. Analytical sensitivity and reproducibility must be sufficient to differentiate the COC concentrations below their respective target levels.

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Types of Decision Errors and Consequences

Decision Error 1 - This decision error occurs when the decision maker determines that the extent of media contaminated with COCs above action levels is not as extensive as it actually is. This error can result in a remediation design that fails to incorporate media contaminated with COC(s) above the action level(s). This could result in the re-mobilization of excavation equipment and delays in the remediation schedule. Also, this could result in media contaminated above action levels remaining after remediation is considered complete, posing a potential threat to human health and the environment.

Decision Error 2 - This decision error occurs when the decision maker determines that the extent of media contaminated above COC action levels is more extensive than it actually is. This error could result in more excavation than necessary, and this excess volume of materials being transferred to the OSDF, or an off-site disposal facility if contamination levels exceed the OSDF WAC.

True State of Nature for the Decision Errors - The true state of nature for Decision Error 1 is that the maximum extent of contamination above the FRL is more extensive than was determined. The true state of nature for Decision Error 2 is that the maximum extent of contamination above the FRL is not as extensive as was determined. Decision Error 1 is the more severe error.

7.0 Optimizing Design for Useable Data

7.1 Sample Collection

A sampling and analytical testing program will delineate the extent of COC contamination in a given area with respect to the action level of interest. Existing data, process knowledge, modeled concentration data, and the origins of contamination will be considered when determining the lateral and vertical extent of sample collection. The cost of collecting and analyzing additional samples will be weighed against the benefit of reduced uncertainty in the delineation model. This will determine the sampling density. Individual PSPs will identify the locations and depths to be sampled, the sampling density necessary to obtain the desired accuracy of the delineation, and if samples will be analyzed by the on-site or off-site laboratory. The PSP will also identify the sampling increments to be selectively analyzed for concentrations of the COC(s) of interest, along with field work requirements. Analytical requirements will be listed in the PSP. The chosen analytical methodologies are able to achieve a detection limit capable of resolving the COC action level. Sampling of groundwater monitoring wells may require different purge requirements than those stated in the SCQ (i.e., dry well definitions or small purge volumes). In order to accommodate sampling of wells that go dry prior to completing the purge of the necessary well volume, attempts to sample the

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monitoring wells will be made 24 hours after purging the well dry. If, after the 24 hour period, the well does not yield the required volume, the analytes will be collected in the order stated in the applicable PSP until the well goes dry. Any remaining analytes will not be collected. In some instances, after the 24 hour wait the well may not yield any water. For these cases, the well will be considered dry and will not be sampled.

7.2 COC Delineation

The media COC delineation will use all data collected under the PSP, and if deemed appropriate by the Project Lead, may also include existing data obtained from physical samples, and if applicable, information obtained through real-time screening. The delineation may be accomplished through modeling (e.g. kriging) of the COC concentration data with a confidence limit specific to project needs that will reduce the potential for Decision Error 1. A very conservative approach to delineation may also be utilized where the boundaries of the contaminated media are extended to the first known vertical and horizontal sample locations that reveal concentrations below the desired action level.

7.3 QC Considerations

Laboratory work will follow the requirements specified in the SCQ. If analysis is to be carried out by an off-site laboratory, it will be a Fluor Daniel Fernald approved full service laboratory. Laboratory quality control measures include a media prep blank, a laboratory control sample (LCS), matrix duplicates and matrix spike. Typical Field QC samples are not required for ASL B analysis. However the PSPs may specify appropriate field QC samples for the media type with respect to the ASL in accordance with the SCQ, such as field blanks, trip blanks, and container blanks. All field QC samples will be analyzed at the associated field sample ASL. Data will be validated per project requirements, which must meet the requirements specified in the SCQ. Project-specific validation requirements will be listed in the PSP.

Per the Sitewide Excavation Plan, the following ASL and data validation requirements apply to all soil and soil field QC samples collected in association with this DQO:

- If samples are analyzed for Pre-design Investigations and/or Precertification, 100% of the data will be analyzed per ASL B requirements. For each laboratory used for a project, 90% of the data will require only a Certificate of Analysis, the other 10% will require the Certificate of Analysis and all associated QA/QC results, and will be validated to ASL B. Per Appendix H of the SEP, the minimum detection level (MDL) for these analyses will be established at approximately 10% of the action level (the action level for precertification is the

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FRL; the action level for pre-design investigations can be several different action levels, including the FRL, the WAC, RCRA levels, ALARA levels, etc.). If this MDL is different from the SCQ-specified MDL, the ASL will default to ASL E, though other analytical requirements will remain as specified for ASL B.

- If samples are analyzed for WAC Attainment and/or RCRA Characteristic Areas Delineation, 100% of the data will be analyzed and reported to ASL B with 10% validated. The ASL B package will include a Certificate of Analysis along with all associated QA/QC results. Total uranium analyses using a higher detection limit than is required for ASL B (10 mg/kg) may be appropriate for WAC attainment purposes since the WAC limit for total uranium is 1,030 mg/kg. In this case, an ASL E designation will apply to the analysis and reporting to be performed under the following conditions:
 - ▶ all of the ASL B laboratory QA/QC methods and reporting criteria will apply with the exception of the total uranium detection limit
 - ▶ the detection limit will be $\leq 10\%$ of the WAC limit (e.g., ≤ 103 mg/kg for total uranium).
- If delineation data are also to be used for certification, the data must meet the data quality objectives specified in the Certification DQO (SL-043).
- Validation will include field validation of field packages for ASL B or ASL D data.

All data will undergo an evaluation by the Project Team, including a comparison for consistency with historical data. Deviations from QC considerations resulting from evaluating inputs to the decision from Section 3, must be justified in the PSP such that the objectives of the decision rule in Section 5 are met.

7.4 Independent Assessment

Independent assessment shall be performed by the FEMP QA organization by conducting surveillances. Surveillances will be planned and documented in accordance with Section 12.3 of the SCQ.

7.5 Data Management

Upon receipt from the laboratory, all results will be entered into the SED as qualified data using standard data entry protocol. The required ASL B, D or E data will undergo analytical validation by the FEMP validation team, as required (see Section 7.3). The Project Manager will be responsible to determine data usability as it pertains to supporting the DQO decision of determining delineation of media

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COC's.

7.6 Applicable Procedures

Sample collection will be described in the PSP with a listing of applicable procedures. Typical related plans and procedures are the following:

- Sitewide Excavation Plan (SEP)
- Sitewide CERCLA Quality Assurance Project Plan (SCQ).
- SMPL-01, *Solids Sampling*
- SMPL-02, *Liquids and Sludge Sampling*
- SMPL-21, *Collection of Field Quality Control Samples*
- EQT-06, *Geoprobe® Model 5400 Operation and Maintenance*
- EQT-23, *Operation of High Purity Germanium Detectors*
- EQT-30, *Operation of Radiation Tracking Vehicle Sodium Iodide Detection System*

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Data Quality Objectives

Delineating the Extent of Constituents of Concern During Remediation Sampling

1A. Task/Description: Delineating the extent of contamination above the FRLs

1.B. Project Phase: (Put an X in the appropriate selection.)

RI ☐ FS ☐ RD ☒ RA ☐ R_A ☐ OTHER ☐

1.C. DOO No.: SL-048, Rev. 5 DOO Reference No.: _____

2. Media Characterization: (Put an X in the appropriate selection.)

Air ☐ Biological ☐ Groundwater ☒ Sediment ☒ Soil ☒
Waste ☒ Wastewater ☐ Surface water ☐ Other (specify) _____

3. Data Use with Analytical Support Level (A-E): (Put an X in the appropriate Analytical Support Level selection(s) beside each applicable Data Use.)

Site Characterization

A ☐ B ☒ C ☐ D ☒ E ☒

Risk Assessment

A ☐ B ☐ C ☐ D ☐ E ☐

Evaluation of Alternatives

A ☐ B ☐ C ☐ D ☐ E ☐

Engineering Design

A ☐ B ☒ C ☐ D ☒ E ☒

Monitoring during remediation

A ☒ B ☒ C ☐ D ☒ E ☒

Other

A ☐ B ☐ C ☐ D ☐ E ☐

4.A. Drivers: Remedial Action Work Plans, Applicable or Relevant and Appropriate Requirements (ARARs) and the OU2 and/or OU5 Record of Decision (ROD).

4.B. Objective: Delineate the extent of media contaminated with a COC (or COCs) with respect to the action level(s) of interest.

5. Site Information (Description):

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DQO #: SL-048, Rev. 5
Effective Date: 2/26/99

6.A. Data Types with appropriate Analytical Support Level Equipment Selection and SCQ Reference: (Place an "X" to the right of the appropriate box or boxes selecting the type of analysis or analyses required. Then select the type of equipment to perform the analysis if appropriate. Please include a reference to the SCQ Section.)

1. pH	<input checked="" type="checkbox"/> *	2. Uranium	<input checked="" type="checkbox"/> *	3. BTX	<input type="checkbox"/>
Temperature	<input checked="" type="checkbox"/> *	Full Radiological	<input checked="" type="checkbox"/> *	TPH	<input type="checkbox"/>
Specific Conductance	<input checked="" type="checkbox"/> *	Metals	<input checked="" type="checkbox"/> *	Oil/Grease	<input type="checkbox"/>
Dissolved Oxygen	<input checked="" type="checkbox"/> *	Cyanide	<input type="checkbox"/>		
Technetium-99	<input checked="" type="checkbox"/> *	Silica	<input type="checkbox"/>		
4. Cations	<input type="checkbox"/>	5. VOA	<input checked="" type="checkbox"/> *	6. Other (specify)	
Anions	<input type="checkbox"/>	BNA	<input checked="" type="checkbox"/> *		
TOC	<input type="checkbox"/>	Pesticides	<input checked="" type="checkbox"/> *		
TCLP	<input checked="" type="checkbox"/> *	PCB	<input checked="" type="checkbox"/> *		
CEC	<input type="checkbox"/>	COD	<input type="checkbox"/>		

*If constituent is identified for delineation in the individual PSP.

6.B. Equipment Selection and SCQ Reference:

Equipment Selection	Refer to SCQ Section
ASL A _____	SCQ Section: _____
ASL B <u>X</u>	SCQ Section: <u>App. G Tables G-1&G-3</u>
ASL C _____	SCQ Section: _____
ASL D <u>X</u>	SCQ Section: <u>App. G Tables G-1&G-3</u>
ASL E <u>X (See sect. 7.3, pg. 6)</u>	SCQ Section: <u>App. G Tables G-1&G-3</u>

7.A. Sampling Methods: (Put an X in the appropriate selection.)

Biased	<input checked="" type="checkbox"/>	Composite	<input type="checkbox"/>	Environmental	<input checked="" type="checkbox"/>	Grab	<input checked="" type="checkbox"/>	Grid	<input checked="" type="checkbox"/>
Intrusive	<input checked="" type="checkbox"/>	Non-Intrusive	<input type="checkbox"/>	Phased	<input type="checkbox"/>	Source	<input type="checkbox"/>		

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7.B. Sample Work Plan Reference: This DQO is being written prior to the PSPs.

Background samples: OU5 RI

7.C. Sample Collection Reference:

Sample Collection Reference: SMPL-01, SMPL-02, EQT-06

8. Quality Control Samples: (Place an "X" in the appropriate selection box.)

8.A. Field Quality Control Samples:

Trip Blanks	<input checked="" type="checkbox"/> *	Container Blanks	<input checked="" type="checkbox"/> ++
Field Blanks	<input checked="" type="checkbox"/> +	Duplicate Samples	<input checked="" type="checkbox"/> ***
Equipment Rinsate Samples	<input checked="" type="checkbox"/> ***	Split Samples	<input checked="" type="checkbox"/> **
Preservative Blanks	<input type="checkbox"/>	Performance Evaluation Samples	<input type="checkbox"/>
Other (specify)			

* For volatile organics only

** Split samples will be collected where required by EPA or OEPA.

*** If specified in PSP.

+ Collected at the discretion of the Project Manager (if warranted by field conditions)

+ + One per Area and Phase Area per container type (i.e. stainless steel core liner/plastic core liner/Geoprobe tube).

8.B. Laboratory Quality Control Samples:

Method Blank	<input checked="" type="checkbox"/>	Matrix Duplicate/Replicate	<input checked="" type="checkbox"/>
Matrix Spike	<input checked="" type="checkbox"/>	Surrogate Spikes	<input type="checkbox"/>
Tracer Spike	<input type="checkbox"/>		

Other (specify) Per SCO

9. Other: Please provide any other germane information that may impact the data quality or gathering of this particular objective, task or data use.

Control Number _____

Fernald Environmental Management Project**Data Quality Objectives****Title: Real Time Precertification Scanning****Number: SL-049****Revision: 1****Effective Date: 7/20/98****Contact Name: Eric Kroger**

Approval: Signature on File
William D. Kelley
DQO Coordinator

Date: 7/17/98

Approval: Signature on File
Joan White
Real-Time Program Manager

Date: 7/20/98

Rev. #	0	1					
Effective Date:	10/15/97	7/20/98					

**Data Quality Objectives
Real Time Precertification Scanning**

1.0 Statement of Problem

Conceptual Model of the Site

The general soil remediation process at the Fernald Environmental Management Project (FEMP) includes field sampling and scanning for several purposes. Initially, pre-design investigations define excavation boundaries. During excavation, sampling for waste disposition issues occurs. After planned excavations are complete, precertification activities are carried out to verify that residual contamination is low enough to pass certification. Finally, certification sampling is performed to verify that clean up goals (i.e., Final remediation levels, [FRLs]) have been obtained, and therefore, remediation is complete in that portion of the FEMP.

Precertification activities include real-time scanning, as discussed in this DQO. In addition, physical soil samples may also be collected during precertification per the latest revision of DQO SL-048. Precertification scanning involves a field survey of the surface soil using mobile and stationary gamma-discerning real-time equipment. Real-time precertification scanning will take place within a soil remediation area or phased area when the expected concentrations of primary radiological constituents of concern (COCs) are below the respective final remediation levels (FRLs). As identified in Section 3.3.3 of the Sitewide Excavation Plan (SEP), this scanning may take place over an excavated surface. When SEP Approach E applies, the scan will take place over an unexcavated surface since no above-FRL contamination is anticipated. Precertification scanning activities must follow the guidelines established in the SEP and the most current version of the User Guidelines, Measurement Strategies, and Operational Factors for Deployment of In-Situ Gamma Spectrometry at the Fernald Site (hereinafter referred to as the Real Time Users Manual). As discussed in these documents, precertification scanning consists of two separate activities:

- Precertification Phase I includes a mobile sodium iodide (NaI) detector scan of as much of the area as is accessible. If parts of the area of interest are inaccessible to the mobile NaI detectors, then the stationary High Purity Germanium (HPGe) detector readings will be obtained in those areas. Target parameters for Precertification Phase I are gross gamma activity and 3-times the FRL (3x FRL) values of total uranium, radium-226 and/or thorium-232, as calculated by a moving two-point average of consecutive readings.
- Precertification Phase II includes stationary detector readings to verify the highest readings obtained by the mobile NaI detector. It also may include "hot spot evaluation," or stationary detector readings at locations where two-point averaging of total uranium, radium-226 and/or thorium-232 has

identified resolvable ASCOC concentrations greater than 3-times the FRL (3x FRL). Target parameters for Precertification Phase II are all resolvable radiological ASCOCs.

Available Resources

Time: Precertification of remediation areas or phased areas must be accomplished by the field team of real-time instrumentation operators (and samplers if necessary), to provide required information in time to support the soil certification effort.

Project Constraints: FEMP remediation activities are being performed in support of the Accelerated Remediation Plan, and soil remediation activities must be consistent with the SEP. Precertification scanning, and if necessary, sampling and analytical testing, must be performed with existing manpower and instrumentation, considering instrument availability, to support the remediation and certification schedule. The results of Precertification Phase I will determine Phase II HPGe sample number and location, which, if necessary, will determine physical sample number and location. Certification and regrading of the site to meet final land use commitments is dependent on successful completion of this work.

Instrumentation: Real-time monitoring includes a mobile sodium iodide (NaI) system mounted on a tractor (the RTRAK), a mobile NaI system mounted on a smaller pushable NaI unit (the RSS), and stationary germanium detectors mounted on a tripod (the HPGe). These instruments can significantly accelerate the pace of necessary characterization by detecting soil contaminated with radiological COCs in a rapid and non-intrusive manner.

2.0 Identify the Decision

Decision

Precertification real-time scanning consists of two decision levels:

Decision 1: The Precertification Phase I screening will be the basis of a decision for the location(s) and number of Precertification Phase II HPGe readings to collect within the area of interest. These readings may be collected to confirm the highest RTRAK activity readings and/or to evaluate a hot-spot.

Decision 2: The Precertification Phase II reading(s) will be the basis of a decision to either:

- 1) excavate residual contaminated soil or conduct additional sampling and/or screening to evaluate potential residual contamination. The decision to excavate would be made if residual contamination could possibly cause

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- certification failure; or,
- 2) make the assumption that an area is likely to pass certification, and therefore, is ready for certification to begin.

Possible Results of Decision 1

The location and number of HPGe readings to be obtained will be established based on Precertification Phase I data, and the target level specified in the PSP. Two-point averaging of the NaI readings will determine ASCOC concentrations or activities with regard to 3x FRL, and this processed data will be mapped for review. This data will also be considered when establishing CUs.

Possible Results of Decision 2

Possible results are as follows:

- 1) The HPGe results of all target parameters indicate that the CU is likely to pass certification for widespread contamination and the hot-spot criteria. If this is the case, the area of interest is ready for certification.
- 2) The HPGe results of all target parameters indicate that the CU is not likely to pass certification for widespread contamination and/or the hot-spot criteria. If this is the case, additional real-time screening data and/or physical samples will be collected to delineate the contaminated soil for remedial excavation.

3.0 Identify Inputs That Affect the Decision

Required Informational Input

Estimates of surface soil contamination and estimates of the variation in surface soil contamination in areas scheduled for certification will be obtained by reviewing and performing spatial analyses on existing analytical data. An area will not be subjected to precertification scanning if above-FRL contamination is still demonstrated to be present.

Sources of Informational Input

Precertification measurements for discernible radiological COCs will involve readings from mobile and stationary in-situ equipment. Physical samples may be necessary to verify real-time measurements.

Action Levels

FRLs established in the OU2 and OU5 Records of Decision are specific for radiological COC, and in some cases, vary between remediation areas. The FRLs were developed to account for health risks, cross media impact, background

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concentrations, and applicable or relevant and appropriate requirements (ARARs) and represent not-to-be exceeded contaminant-specific average soil concentrations. Real time HPGe readings may also be taken to support excavation to ALARA requirements. Physical samples may be necessary to verify HPGe readings and determine whether applicable FRLs or other target levels are met.

The 3x FRL concentrations/activities obtained through two-point averaging of mobile NaI scan data have been developed based on the ability of the instrumentation to resolve these levels. Refer to the Real-Time User's Manual for additional details.

Methods of Data Collection

Precertification Phase I readings will be utilized for semi-quantitative coverage of the areas of concern, and additional quantitative information will be obtained during Precertification Phase II by strategic stationary HPGe readings. Analysis and data management for Precertification Phase I data will be conducted at ASL A, while Precertification Phase data will be conducted at ASL B. All readings will be performed in compliance with operating procedures, the Real-Time User's Manual, and the SEP.

The Precertification Phase I data will be utilized to establish general radiological concentration isolines and detect areas of elevated radiological activity. The Precertification Phase II HPGe gamma detectors will be used when more refined supporting quantitative resolution is required. Daily source checks of real-time detectors will be conducted as directed in the systems' operational procedure. Sample data will be reviewed at least daily by Field Supervisor of the sampling team.

Surface physical samples may be collected to verify HPGe readings in confirming action levels for FRL and WAC attainment. If needed, physical sampling will be identified in precertification PSPs to verify that HPGe readings are below FRLs or other target levels. The data quality of these samples will be consistent with the latest revision of DQO SL-048.

4.0 The Boundaries of the Situation

Spatial Boundaries

Domain of the Decision: Boundaries are limited to surface soils of areas planned for certification, and adjacent areas, as defined in the individual work plans.

Population of Soils: The soils affected are surface soils (to a nominal depth of 6 inches), which include recently excavated surfaces and undisturbed soils

associated with excavation areas as designated in the individual work plans.

Temporal Boundaries

Time Constraints on Real-Time Scanning: The scheduling of precertification scanning is closely associated with the excavation schedule. Precertification real-time scanning must be conducted after excavation, if any, and before certification activities begin. The scanning data must be returned and processed into useable format in time for the information to be useful within the current remediation schedule.

Practical Considerations: In-situ gamma spectrometry measurements cannot be made during snow coverage or standing water conditions or during precipitation. Field analytical methods should also be limited to unsaturated soils. Most areas undergoing scanning are flat, open terrain, and are readily accessible to the equipment. Some areas may require preparation, such as cutting of grass or removal of undergrowth, fencing and other obstacles. In situ measurements will require coordination with appropriate maintenance personnel for site preparation. Physical and environmental parameters will be recorded and assessed during data collection. Refer to the Real-Time User's Manual for additional details.

5.0 Develop a Logic Statement

Parameters of Interest

For Precertification Phase I, parameters of interest are gross gamma activity and 3-times the FRL values of total uranium, radium-226 and thorium-232, as calculated by a moving two-point average of consecutive readings. For Precertification Phase II, parameters of interest are all HPGe-discernable radiological ASCOCs.

Precertification Target Levels

For Precertification Phase I, target levels are the highest gross gamma activity readings, and 3x FRL for total uranium, radium-226 and thorium-232. For Precertification Phase II, target levels are the FRLs of all discernable radiological ASCOCs.

Decision Rules

Following Precertification Phase I, any areas or patterns of high gross gamma activity will be scanned with the HPGe. Also, any individual activities/ concentrations greater than 3x FRL will be scanned with the HPGe for hot spot evaluation per section 3.3 of the Real-Time User's Manual.

Following Precertification Phase II, if HPGe results that indicate a CU could fail certification the soil may be evaluated further with physical sampling or HPGe scanning. Remedial excavations followed by additional real-time scanning of the new surface could result if certification failure appears likely. Also, any identified hot-spot will be removed prior to initiating certification sampling. A CU will be considered ready for certification when these results indicate no wide-spread contamination, or localized contamination (i.e., hot-spots).

6.0 Establish Constraints on the Uncertainty of the Decision

Range of Parameter Limits

The range of soil concentrations anticipated will be from background (natural concentrations) to greater than the maximum subsurface value indicated in the RI database. It is anticipated that the concentrations will be below the FRL prior to the onset of precertification sampling.

Types of Decision Errors and Consequences

Decision Error 1: This decision error occurs when the decision maker decides an area is ready for certification when the average soil concentration in an area is still above the FRL, or soil still contains COC concentrations above two-times the FRL (the hot-spot criteria). This decision error would lead to the area failing certification and/or hot spot criteria. If an area fails certification sampling and analytical testing, remobilization and further excavation, precertification, and certification sampling would be necessary.

Decision Error 2: This decision error occurs when the decision maker decides that additional HPGe and/or physical samples are necessary based on Precertification Phase II results; or the decision maker directs the excavation (or additional excavation) of soils, when they actually have average radiological COC concentrations below the FRLs and no ASCOC hot spots (i.e., concentrations above two-times the FRL). This would result in added sampling and analytical costs and/or added costs due to the excavation of clean soils and an increased volume in the OSDF. This is not as severe as Decision Error 1. The addition of clean soil to the OSDF would result in further reduction, although minimally, to human health risk in the remediated areas.

True State of Nature for the Decision Errors

The true state of nature for Decision Error 1 is that the actual concentrations of radiological ASCOCs are greater than their FRLs and/or the hot spot criteria. The true state of nature for Decision Error 2 is that the true concentrations of COCs are below their FRLs and/or hot spot criteria. Decision Error 1 would be the more

severe error.

7.0 Optimize a Design for Obtaining Quality Data

As discussed in Section 3.3.3 of the SEP, precertification scanning consists of two separate activities. Refer to Section 1.0 of this DQO for a general overview of Precertification Phase I and Precertification Phase II.

Real-time radiological COC data will be generated by two methods: 1) the mobile sodium iodide (NaI) detection system currently mounted on the RTRAK or RSS, which will provide a semi-quantitative radiological activity in surface soil, and 2) the high purity germanium (HPGe) systems that will provide stationary readings and quantitative measurements of radiological COCs. If necessary, physical samples will also be collected for HPGe data verification and precertification decision making.

Sodium Iodide (NaI) System

The NaI detectors will be used to achieve coverage of the entire area, or as possible, taking into consideration the topographic and vegetative constraints which limit access by NaI systems. The NaI systems currently mounted on the RTRAK or RSS will be used to obtain measurements over an area specified in a PSP to detect radiological activity patterns and elevated radiological activity. The NaI detector system(s) will be used at speeds and count times specified in the PSP, and consistent with the Real-time User's Manual, and agreed to by the EPA. The mobile systems will be electronically coupled with a global positioning system (GPS) rover and base unit to record each reading location. The 0.4 meter overlap option will be used, as discussed in Section 4.3.1 of the Real-time User's Manual. Counting and positioning information will be recorded continuously on a field personal computer (PC) and stored on disk or hard drive for future downloading on the site soil database and Graphical Information System (GIS) system.

Information from the NaI/GPS system will be recorded on the PC and transferred to the Unix system through the local area network on a regular (at least daily) basis. The information will be plotted on the FEMP GIS system and isolines and elevated radiological activity identified for review. The RTRAK system will attempt to provide complete coverage of the area. With the output, isolines of "relative" contamination can be developed and locations of elevated activity/concentrations can be identified.

Data reduction is an important aspect of NaI system data use. Individual total uranium, radium-226 and thorium-232 concentrations will undergo two-point averaging. The two-point averaged values will be mapped and evaluated with respect to 3x FRL.

Precertification Phase I measurements will not be used for precertification decision making; however, they will be used to determine the location and number of Precertification Phase II HPGe measurements.

In-Situ HPGe Detectors

The HPGe detector may be used during Precertification Phase I or Precertification Phase II, as follows:

- During Precertification Phase I, the HPGe will only be used in areas where topographic or vegetative constraints prevent mobile NaI detector access. The density of an HPGe grid used to cover the area will depend on the mode and expected areal extent of contamination, as established through RI/FS data or process knowledge. The density of HPGe grids, detector height and count times will be specified in the PSP and consistent with the most current version of the Real-Time User's Manual.
- During Precertification Phase II, the HPGe detector will be used at strategic locations established through the Precertification Phase I screening. These locations are where the highest readings of gross gamma activity were identified and/or where individual ASCOC concentrations were identified as hot spots. The HPGe will be used to quantify radiological COC levels, which in turn provide information on if an area is likely to pass certification.

Surface moisture readings will be obtained in conjunction with the HPGe using the Troxler nuclear moisture and density gauge, as specified in the PSP. If conditions do not permit the use of the Troxler, soil samples will be collected and submitted to the on-site laboratory for percent moisture analysis. The soil moisture data will be used as is discussed in Section 4.11 of the Real-Time User's Manual. The data will be computer corrected for the moisture data via Lab View software. Background radon monitoring will also occur in conjunction with the HPGe, as specified in the PSP. Refer to the Section 5.3 of the Real-Time User's Manual for a discussion of how soil moisture and background data are used.

Physical Soil Sampling

Physical samples may be collected and analyzed for target radiological COCs to verify the HPGe measurements and/or to delineate above-FRL contaminated soil. If this is the case, physical sampling will be consistent with Data Quality Objectives SL-048. Criteria for obtaining physical samples, such as sample density, will be specified in the Precertification PSP, if necessary. As specified in DQO SL-048, the minimum data quality acceptable for this purpose will be ASL B. Field QC, ASL and Validation requirements will be consistent with the SCQ and the more

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stringent Soil Characterization and Excavation Project requirements.

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**Data Quality Objectives
Real Time Precertification Scanning**

- 1A. Task/Description: Precertification real-time scanning.
1B. Project Phase: (Put an X in the appropriate selection.)

RI ☐ FS ☐ RD ☐ RA ☒ R_vA ☐ OTHER ☐

1.C. DQO No.: SL-049, Rev. 1 DQO Reference No.: SL-048

2. Media Characterization: (Put an X in the appropriate selection.)

Air ☐ Biological ☐ Groundwater ☐ Sediment ☒ Soil ☒
Waste ☐ Wastewater ☐ Surface water ☐ Other (specify) _____

3. Data Use with Analytical Support Level (A-E): (Put an X in the appropriate Analytical Support Level selection(s) beside each applicable Data Use.)

Site Characterization

A ☒ B ☒ C ☐ D ☐ E ☐

Risk Assessment

A ☐ B ☐ C ☐ D ☐ E ☐

Evaluation of Alternatives

A ☐ B ☐ C ☐ D ☐ E ☐

Engineering Design

A ☐ B ☐ C ☐ D ☐ E ☐

Monitoring during remediation activities

A ☒ B ☒ C ☐ D ☐ E ☐

Other: Precertification

A ☒ B ☒ C ☐ D ☐ E ☐

- 4.A. Drivers: Applicable or Relevant and Appropriate Requirements (ARARs), Operable Unit 5 Record of Decision (ROD), the Real-Time User's Manual, the Sitewide Excavation Plan and the Pre-certification Project-Specific Plan (PSP).

- 4.B. Objective: To determine if the area of interest is likely to pass certification for all HPGe discernable radiological COCs

5. Site Information (Description): The OU2 and OU5 RODs have identified areas at the

FEMP that require remediation activities. The RODs specify that the soils in these areas will be clean and demonstrated to be below the FRLs. Pre-certification will be necessary for areas of the site with soils that are scheduled for certification.

6.A. Data Types with appropriate Analytical Support Level Equipment Selection and SCQ Reference: (Place an "X" to the right of the appropriate box or boxes selecting the type of analysis or analyses required. Then select the type of equipment to perform the analysis if appropriate. Please include a reference to the SCQ Section.)

1. pH	<input type="checkbox"/>	2. Uranium	<input checked="" type="checkbox"/> *	3. BTX	<input type="checkbox"/>
Temperature	<input type="checkbox"/>	Full Rad.	<input checked="" type="checkbox"/> *	TPH	<input type="checkbox"/>
Spec. Conductance	<input type="checkbox"/>	Metals	<input type="checkbox"/>	Oil/Grease	<input type="checkbox"/>
Dissolved Oxygen	<input type="checkbox"/>	Cyanide	<input type="checkbox"/>		
Technitium-99	<input type="checkbox"/>	Silica	<input type="checkbox"/>		
4. Cations	<input type="checkbox"/>	5. VOA	<input type="checkbox"/>	6. Other (specify)	
Anions	<input type="checkbox"/>	ABN	<input type="checkbox"/>	Percent Moisture	
TOC	<input type="checkbox"/>	Pesticides	<input type="checkbox"/>		
TCLP	<input type="checkbox"/>	PCB	<input type="checkbox"/>		
CEC	<input type="checkbox"/>				
COD	<input type="checkbox"/>				

* If specified in the PSP

6.B. Equipment Selection and SCQ Reference:

Equipment Selection

Refer to SCQ Section

ASL A Mobile NaI, HPGe (Precert. Phase I)

SCQ Section: Not Applicable

ASL B HPGe (Precertification Phase II)

SCQ Section: App. G, Table 1

ASL C _____

SCQ Section: _____

ASL D _____

SCQ Section: _____

ASL E _____

SCQ Section: _____

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7.A. Sampling Methods: (Put an X in the appropriate selection.)

Biased ☒ Composite ☐ Environmental ☐ Grab ☒ Grid ☒
Intrusive ☐ Non-Intrusive ☒ Phased ☐ Source ☐

7.B. Sample Work Plan Reference: The DQO is being established prior to completion of the Project-Specific Plans.

Background samples: OU5 RI/FS

7.C. Sample Collection Reference:

*-EQT-22, Characterization of Gamma Sensitive Detectors**-EQT-23, Operation of High Purity Germanium Detectors**-EQT-30, Operation of the Radiation Tracking Vehicle Sodium Iodide Detection System**-User Guidelines, Measurement Strategies, and Operational Factors for Deployment of In-Situ Gamma Spectrometry at the Fernald Site*

8. Quality Control Samples: (Place an "X" in the appropriate selection box.)

8.A. Field Quality Control Samples:

Trip Blanks ☐
Field Blanks ☐
Equipment Rinsate Samples ☐
Preservative Blanks ☐

Container Blanks ☐
Duplicate Samples ☒*
Split Samples ☐
Performance Evaluation Samples ☐

Other (specify) _____

* If specified in the PSP.

8.B. Laboratory Quality Control Samples:

Method Blank ☐
Matrix Spike ☐

Matrix Duplicate/Replicate ☐
Surrogate Spikes ☐

Other (specify) _____

9. Other: Please provide any other germane information that may impact the data quality or gathering of this particular objective, task or data use.

APPENDIX C

**SOIL SAMPLES TO BE COLLECTED FOR
THE AREA 5 PREDESIGN INVESTIGATION**

APPENDIX C

USING THE SAMPLE IDENTIFICATION TABLES

Data collected under this PSP will ultimately be used to define remedial excavation depths in this part of the site. Therefore, it is critical to be able to link each sample to an actual *depth below surface* that it was collected. However, varying amounts of overlying materials (concrete, asphalt, gravel, etc.) may exist at the different boring locations. These materials cannot be considered for sample collection, but must be accounted for when defining excavation depth. As a result, the actual depth at which soil sample collection will begin cannot be determined before the actual boring activity and consequently, this PSP can only identify soil intervals as *depth below overlying material*.

To account for the above, the depth identifier will initially be a sequential letter that denotes each sample for collection at a *depth beneath overlying material*. The sample specified for collection closest to the surface is identified as "a", the next deepest sample specified for collection is identified as "b", and so on. Upon collection, the sampling technician will replace the letter with a number that corresponds to a 6-inch interval of the actual *depth below surface*. So the 0 to 0.5-foot sample would be identified with a "1"; the 0.5 to 1-foot sample would be identified with a "2", and so on. This number can be calculated as two times the bottom depth (below surface) of the 6-inch interval.

So assume a boring specifies the collection of the 0 to 0.5-foot, 3 to 3.5-foot and 6 to 6.5-foot intervals below overlying material. The samples are identified as -a, -b and -c, respectively. Now assume that 12 inches of overlying material is discovered at that location. That would mean that the most shallow sample would then be collected at 1 to 1.5 feet below surface, and a number "3" [two times 1.5 feet (the bottom depth)] would replace the letter "a". The second sample would be collected at 4 to 4.5 feet below surface, and the number "9" would replace the letter "b", and the third sample would be collected at 7 to 7.5 feet below surface, and the number "15" would replace the letter "c".

This appendix lists all samples increments (depths below overlying material) to be collected from each boring. If any uncertainty exists at the time of sampling about the correct sampling interval or any sampling contingencies that arise, the Field Sampling Lead should contact the Characterization Lead for direction.

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SAMPLES COLLECTED FOR THE AREA 5 PREDESIGN INVESTIGATION

Location ID	Northing '83	Easting '83	Depth	Depth ID	Analysis	Sample ID
A5A-1	479842.29	1349149.91	0'-0.5'	1	TAL B	A5A-1-1-RMP
A5A-2	479681.05	1349180.31	0'-0.5'	1	TAL A	A5A-2-1-R
A5A-3	479710.31	1349293.84	0'-0.5'	1	TAL A	A5A-3-1-R
A5A-4	479681.24	1349636.56	0'-0.5'	1	TAL A	A5A-4-1-R
A5A-5	479653.81	1349744.58	0.5'-1'	a	TAL B	A5A-5-a-RMP
			1.5'-2'	b	TAL B	A5A-5-b-RMP
A5A-6	479718.02	1349870.87	0.5'-1'	a	TAL A	A5A-6-a-R
			1.5'-2'	b	TAL A	A5A-6-b-R
			TBD	TBD	A/B Screen	A5A-6-?-AB
A5A-7	479647.77	1349910.67	0'-0.5'	1	TAL A	A5A-7-1-R
A5A-8	479686.98	1350020.79	0'-0.5'	1	TAL A	A5A-8-1-R
A5A-9	479614.46	1349259.12	0'-0.5'	1	TAL B	A5A-9-1-RMP
			0-0.5	1	A/B Screen	A5A-9-1-AB
A5A-10	479628.27	1349418.21	0'-0.5'	1	TAL A	A5A-10-1-R
A5A-11	479496.79	1349205.46	0'-0.5'	1	TAL A	A5A-11-1-R
A5A-12	479507.53	1349447.09	0'-0.5'	1	TAL A	A5A-12-1-R
A5A-13	479582.49	1349591.36	0'-0.5'	a ¹	TAL B	A5A-13-a-RMP
A5A-14	479486.39	1349498.57	0.5'-1'	a	TAL A	A5A-14-a-R
			1.5'-2'	b	TAL A	A5A-14-b-R
A5A-15	479515.8	1349676.46	0.5'-1'	a	TAL A	A5A-15-a-R
			1.5'-2'	b	TAL A	A5A-15-b-R
A5A-16	479500.92	1349780.99	0'-0.5'	1	TAL A	A5A-16-1-R
A5A-17	479544.32	1349838.65	0.5'-1'	a	TAL B	A5A-17-a-RMP
			1.5'-2'	b	TAL B	A5A-17-b-RMP
A5A-18	479508.63	1349931.55	0'-0.5'	1	TAL A	A5A-18-1-R
A5A-19	479558.29	1350089.72	0'-0.5'	1	TAL A	A5A-19-1-R
A5A-20	479482.11	1350191.78	0'-0.5'	1	TAL A	A5A-20-1-R
A5A-21	479612.76	1350245.46	0'-0.5'	1	TAL B	A5A-21-1-RMP
			0-0.5	1	A/B Screen	A5A-21-1-AB
A5A-22	479505.66	1350233.57	0'-0.5'	1	TAL A	A5A-22-1-R
A5A-23	479559.97	1350370.95	0'-0.5'	a ²	TAL A	A5A-23-a-R
A5A-24	479460.09	1350459.77	0'-0.5'	1	TAL A	A5A-24-1-R
A5A-25	479418.86	1349209.28	0.5'-1'	a	TAL B	A5A-25-a-RMP
			1.5'-2'	b	TAL B	A5A-25-b-RMP
A5A-26	479274.82	1349245.22	0.5'-1'	a	TAL A	A5A-26-a-R
			1.5'-2'	b	TAL A	A5A-26-b-R
			TBD ³	c	TAL D	A5A-26-c-R
A5A-27	479405.24	1349444.9	0.5'-1'	a	TAL A	A5A-27-a-R
			0.5'-1'	a	TAL F	A5A-27-a-S
			1.5'-2'	b	TAL A	A5A-27-b-R
			1.5'-2'	b	TAL F	A5A-27-b-S
			TBD	TBD	A/B Screen	A5A-27-?-AB

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APPENDIX C
SAMPLES COLLECTED FOR THE AREA 5 PREDESIGN INVESTIGATION

Location ID	Northing '83	Easting '83	Depth	Depth ID	Analysis	Sample ID
A5A-28	479316.24	1349458.96	0.5'-1'	a	TAL A	A5A-28-a-R
			1.5'-2'	b	TAL A	A5A-28-b-R
A5A-29	479351.55	1349617.42	0.5'-1'	a	TAL B	A5A-29-a-RMP
			1.5'-2'	b	TAL B	A5A-29-b-RMP
			TBD ³	c	TAL D	A5A-29-c-R
A5A-30	479256.61	1349626.43	0.5'-1'	a	TAL A	A5A-30-a-R
			1.5'-2'	b	TAL A	A5A-30-b-R
A5A-31	479374.07	1349735.84	0.5'-1'	a	TAL A	A5A-31-a-R
			1.5'-2'	b	TAL A	A5A-31-b-R
A5A-32	479266.47	1349744.62	0.5'-1'	a	TAL A	A5A-32-a-R
			0.5'-1'	a	TAL F	A5A-32-a-S
			1.5'-2'	b	TAL A	A5A-32-b-R
			1.5'-2'	b	TAL F	A5A-32-b-S
A5A-33	479419.97	1349806.69	0.5'-1'	a	TAL B	A5A-33-a-RMP
			1.5'-2'	b	TAL B	A5A-33-b-RMP
A5A-34	479308.83	1349802.72	0.5'-1'	a	TAL A	A5A-34-a-R
			1.5'-2'	b	TAL A	A5A-34-b-R
A5A-35	479342.84	1349918.11	0.5'-1'	a	TAL A	A5A-35-a-R
			0.5'-1'	a	TAL F	A5A-35-a-S
			1.5'-2'	b	TAL A	A5A-35-b-R
			1.5'-2'	b	TAL F	A5A-35-b-S
A5A-36	479242.25	1349994.79	0.5'-1'	a	TAL A	A5A-36-a-R
			1.5'-2'	b	TAL A	A5A-36-b-R
A5A-37	479437.84	1350023.39	0.5'-1'	a	TAL B	A5A-37-a-RMP
			1.5'-2'	b	TAL B	A5A-37-b-RMP
			TBD	TBD	A/B Screen	A5A-37-?-AB
A5A-38	479313.95	1350023.95	0.5'-1'	a	TAL A	A5A-38-a-R
			1.5'-2'	b	TAL A	A5A-38-b-R
A5A-39	479378.91	1350187.85	0.5'-1'	a	TAL A	A5A-39-a-R
			0.5'-1'	a	TAL F	A5A-39-a-S
			1.5'-2'	b	TAL A	A5A-39-b-R
			1.5'-2'	b	TAL F	A5A-39-b-S
A5A-40	479329.85	1350223.28	0.5'-1'	a	TAL A	A5A-40-a-R
			1.5'-2'	b	TAL A	A5A-40-b-R
			TBD	TBD	A/B Screen	A5A-40-?-AB
A5A-41	479194.49	1349330.39	0'-0.5'	1	TAL B	A5A-41-1-RMP
A5A-42	479151.12	1349201.02	0.5'-1'	a	TAL A	A5A-42-a-R
			0.5'-1'	a	TAL F	A5A-42-a-S
			1.5'-2'	b	TAL A	A5A-42-b-R
			1.5'-2'	b	TAL F	A5A-42-b-S
A5A-43	479185.35	1349492.82	0'-0.5'	1	TAL A	A5A-43-1-R
A5A-44	479090.8	1349453.73	0.5'-1'	a	TAL A	A5A-44-a-R
			1.5'-2'	b	TAL A	A5A-44-b-R

APPENDIX C
SAMPLES COLLECTED FOR THE AREA 5 PREDESIGN INVESTIGATION

Location ID	Northing '83	Easting '83	Depth	Depth ID	Analysis	Sample ID
A5A-45	479189.86	1349595.26	0'-0.5'	1	TAL B	A5A-45-1-RMP
			0-0.5	1	A/B Screen	A5A-45-1-AB
A5A-46	478980.62	1349612.25	0.5'-1'	a	TAL A	A5A-46-a-R
			1.5'-2'	b	TAL A	A5A-46-b-R
A5A-47	479089.38	1349706.59	0.5'-1'	a	TAL A	A5A-47-a-R
			0.5'-1'	a	TAL F	A5A-47-a-S
			1.5'-2'	b	TAL A	A5A-47-b-R
			1.5'-2'	b	TAL F	A5A-47-b-S
A5A-48	478968.33	1349714.52	0.5'-1'	a	TAL A	A5A-48-a-R
			1.5'-2'	b	TAL A	A5A-48-b-R
A5A-49	479167.08	1349808.81	0.5'-1'	a	TAL B	A5A-49-a-RMP
			1.5'-2'	b	TAL B	A5A-49-b-RMP
A5A-50	478998.84	1349803.88	0.5'-1'	a	TAL A	A5A-50-a-R
			0.5'-1'	a	TAL F	A5A-50-a-S
			1.5'-2'	b	TAL A	A5A-50-b-R
			1.5'-2'	b	TAL F	A5A-50-b-S
A5A-51	479196.04	1349914.01	0.5'-1'	a	TAL A	A5A-51-a-R
			1.5'-2'	b	TAL A	A5A-51-b-R
A5A-52	479019.8	1349939.61	0.5'-1'	a	TAL A	A5A-52-a-R
			1.5'-2'	b	TAL A	A5A-52-b-R
A5A-53	479149.41	1350027.68	0.5'-1'	a	TAL B	A5A-53-a-RMP
			1.5'-2'	b	TAL B	A5A-53-b-RMP
A5A-54	479204.07	1350145.44	0.5'-1'	a	TAL A	A5A-54-a-R
			1.5'-2'	b	TAL A	A5A-54-b-R
A5A-55	479145.23	1350202.58	0.5'-1'	a	TAL A	A5A-55-a-R
			0.5'-1'	a	TAL F	A5A-55-a-S
			1.5'-2'	b	TAL A	A5A-55-b-R
			1.5'-2'	b	TAL F	A5A-55-b-S
A5A-56	479250.23	1350287.6	0.5'-1'	a	TAL A	A5A-56-a-R
			1.5'-2'	b	TAL A	A5A-56-b-R
A5A-57	479058.69	1349264.97	0.5'-1'	a	TAL B	A5A-57-a-RMP
			1.5'-2'	b	TAL B	A5A-57-b-RMP
			TBD ³	c	TAL D	A5A-57-c-R
A5A-58	478920.9	1349308.49	0'-0.5'	a ¹	TAL A	A5A-58-a-R
A5A-59	479001.75	1349422.98	0.5'-1'	a	TAL A	A5A-59-a-R
			0.5'-1'	a	TAL F	A5A-59-a-S
			1.5'-2'	b	TAL A	A5A-59-b-R
			1.5'-2'	b	TAL F	A5A-59-b-S
A5A-60	479073.72	1350136.46	0'-0.5'	a ¹	TAL A	A5A-60-a-R
A5A-61	478908.77	1349552.21	0'-0.5'	a ¹	TAL B	A5A-61-a-RMP
			0'-0.5'	a ¹	A/B Screen	A5A-61-?-AB
A5A-62	478857.34	1349670.86	0'-0.5'	1	TAL A	A5A-62-1-R
A5A-63	478900.7	1349857.39	0'-0.5'	1	TAL A	A5A-63-1-R

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APPENDIX C
SAMPLES COLLECTED FOR THE AREA 5 PREDESIGN INVESTIGATION

Location ID	Northing '83	Easting '83	Depth	Depth ID	Analysis	Sample ID
A5A-64	478858.41	1349948.03	0'-0.5'	1	TAL A	A5A-64-1-R
A5A-65	479011.26	1350007.39	0.5'-1'	a	TAL B	A5A-65-a-RMP
			1.5'-2'	b	TAL B	A5A-65-b-RMP
A5A-66	479073.72	1350136.46	0.5'-1'	a	TAL A	A5A-66-a-R
			1.5'-2'	b	TAL A	A5A-66-b-R
A5A-67	478956.69	1350210.73	0.5'-1'	a	TAL A	A5A-67-a-R
			1.5'-2'	b	TAL A	A5A-67-b-R
A5A-68	478994.44	1350273.59	0.5'-1'	a	TAL A	A5A-68-a-R
			0.5'-1'	a	TAL F	A5A-68-a-S
			1.5'-2'	b	TAL A	A5A-68-b-R
			1.5'-2'	b	TAL F	A5A-68-b-S
A5A-69	478782.5	1349758.18	0'-0.5'	1	TAL B	A5A-69-1-RMP
A5A-70	478758.96	1349838.26	0'-0.5'	1	TAL A	A5A-70-1-R
A5A-71	478626.07	1349874.46	0'-0.5'	1	TAL A	A5A-71-1-R
A5A-72	478787.32	1349958.03	0'-0.5'	1	TAL A	A5A-72-1-R
A5A-73	478823.03	1350047.74	0'-0.5'	1	TAL B	A5A-73-1-RMP
A5A-74	478729.78	1350088.39	0'-0.5'	1	TAL A	A5A-74-1-R
A5A-75	478859.48	1350161.16	0'-0.5'	1	TAL A	A5A-75-1-R
			0'-0.5'	1	A/B Screen	A5A-9-1-AB
A5A-76	478813.6	1350265.63	0.5'-1'	a	TAL A	A5A-76-a-R
			1.5'-2'	b	TAL A	A5A-76-b-R
A5A-77	480209.7	1350705.06	0'-0.5'	1	TAL B	A5A-77-1-RMP
			0'-0.5'	1	A/B Screen	A5A-9-1-AB
A5A-78	480152.6	1350849.69	0'-0.5'	1	TAL A	A5A-78-1-R
A5A-79	480066.16	1350705.18	0'-0.5'	a ¹	TAL A	A5A-79-a-R
A5A-80	480097.47	1350817.29	0'-0.5'	a ¹	TAL A	A5A-80-a-R
A5A-81	479928.5	1350732.65	0'-0.5'	a ¹	TAL B	A5A-81-a-RMP
A5A-82	479947.61	1350791.27	0'-0.5'	1	TAL A	A5A-82-1-R
A5A-83	479805.48	1350744.35	0'-0.5'	1	TAL A	A5A-83-1-R
A5A-84	479780.62	1350844.64	0'-0.5'	1	TAL A	A5A-84-1-R
A5A-85	479928.5	1350732.65	0'-0.5'	1	TAL B	A5A-85-1-RMP
A5A-86	479644.82	1350844.46	0'-0.5'	1	TAL A	A5A-86-1-R
			0'-0.5'	1	A/B Screen	A5A-86-1-AB
A5A-87	479552.36	1350680.48	0'-0.5'	1	TAL A	A5A-87-1-R
A5A-88	479523.97	1350796.13	0'-0.5'	1	TAL A	A5A-88-1-R
A5A-89	479457.91	1350682.57	0'-0.5'	1	TAL B	A5A-89-1-RMP
A5A-90	479466.46	1350830.36	0'-0.5'	1	TAL A	A5A-90-1-R
A5A-91	479363.6	1350776.96	0'-0.5'	1	TAL A	A5A-91-1-R
A5A-92	479303.38	1350700.76	0'-0.5'	1	TAL A	A5A-92-1-R

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APPENDIX C

SAMPLES COLLECTED FOR THE AREA 5 PREDESIGN INVESTIGATION

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Location ID	Northing '83	Easting '83	Depth	Depth ID	Analysis	Sample ID
SURFACE SAMPLES COLLECTED IN A5A-EF						
A5A-EF1	479431.26	1350328.85	0'-0.5'	1	TAL B	A5A-EF1-1-RMP
A5A-EF2	479424.28	1350389.6	0'-0.5'	1	TAL B	A5A-EF2-1-RMP
A5A-EF3	479445.23	1350475.91	0'-0.5'	1	TAL B	A5A-EF3-1-RMP
A5A-EF4	479423.53	1350614.29	0'-0.5'	1	TAL B	A5A-EF4-1-RMP
A5A-EF5	479401.47	1350332.06	0'-0.5'	1	TAL B	A5A-EF5-1-RMP
A5A-EF6	479369.27	1350450.58	0'-0.5'	1	TAL B	A5A-EF6-1-RMP
A5A-EF7	479364.8	1350511.67	0'-0.5'	1	TAL B	A5A-EF7-1-RMP
A5A-EF8	479389.11	1350558.42	0'-0.5'	1	TAL B	A5A-EF8-1-RMP
A5A-EF9	479340.45	1350343.66	0'-0.5'	1	TAL B	A5A-EF9-1-RMP
A5A-EF10	479343.68	1350382.7	0'-0.5'	1	TAL B	A5A-EF10-1-RMP
A5A-EF11	479313.02	1350503.63	0'-0.5'	1	TAL B	A5A-EF11-1-RMP
			0'-0.5'	1	TAL B	A5A-EF11-1-RMP-D
A5A-EF12	479341.06	1350621.12	0'-0.5'	1	TAL B	A5A-EF12-1-RMP
A5A-EF13	479273.52	1350363.29	0'-0.5'	1	TAL B	A5A-EF13-1-RMP
A5A-EF14	479274.57	1350431.5	0'-0.5'	1	TAL B	A5A-EF14-1-RMP
A5A-EF15	479280.69	1350467.85	0'-0.5'	1	TAL B	A5A-EF15-1-RMP
			0'-0.5'	1	TAL B	A5A-EF15-1-RMP-D
A5A-EF16	479274.43	1350522.49	0'-0.5'	1	TAL B	A5A-EF16-1-RMP
A5A-EF17	479278.9	1350605.9	0'-0.5'	1	TAL B	A5A-EF17-1-RMP
A5A-EF18	479228.75	1350325.79	0'-0.5'	1	TAL B	A5A-EF18-1-RMP
A5A-EF19	479250.29	1350482.23	0'-0.5'	1	TAL B	A5A-EF19-1-RMP
			0'-0.5'	1	A/B Screen	A5A-EF19-1-AB
A5A-EF20	479254.21	1350619.22	0'-0.5'	1	TAL B	A5A-EF20-1-RMP
A5A-EF21	479191.01	1350330.61	0'-0.5'	1	TAL B	A5A-EF21-1-RMP
A5A-EF22	479198.4	1350457.57	0'-0.5'	1	TAL B	A5A-EF22-1-RMP
A5A-EF23	479213.09	1350529.06	0'-0.5'	1	TAL B	A5A-EF23-1-RMP
A5A-EF24	479187.28	1350577.98	0'-0.5'	1	TAL B	A5A-EF24-1-RMP
A5A-EF25	479137.53	1350396.47	0'-0.5'	1	TAL B	A5A-EF25-1-RMP
A5A-EF26	479145.41	1350453.83	0'-0.5'	1	TAL B	A5A-EF26-1-RMP
A5A-EF27	479170.58	1350501.66	0'-0.5'	1	TAL B	A5A-EF27-1-RMP
A5A-EF28	479151.44	1350573.44	0'-0.5'	1	TAL B	A5A-EF28-1-RMP
A5A-EF29	479081.12	1350321.7	0'-0.5'	1	TAL B	A5A-EF29-1-RMP
A5A-EF30	479099.52	1350376.25	0'-0.5'	1	TAL B	A5A-EF30-1-RMP
			0'-0.5'	1	TAL B	A5A-EF30-1-RMP-D
A5A-EF31	479081.56	1350434.07	0'-0.5'	1	TAL B	A5A-EF31-1-RMP
A5A-EF32	479085.23	1350488.85	0'-0.5'	1	TAL B	A5A-EF32-1-RMP
A5A-EF33	479034.83	1350346.96	0'-0.5'	1	TAL B	A5A-EF33-1-RMP
A5A-EF34	479036.18	1350385.55	0'-0.5'	1	TAL B	A5A-EF34-1-RMP
A5A-EF35	478963.85	1350356.66	0'-0.5'	1	TAL B	A5A-EF35-1-RMP
A5A-EF36	478976.35	1350415.92	0'-0.5'	1	TAL B	A5A-EF36-1-RMP
			0'-0.5'	1	A/B Screen	A5A-EF36-1-AB

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APPENDIX C
SAMPLES COLLECTED FOR THE AREA 5 PREDESIGN INVESTIGATION

Location ID	Northing '83	Easting '83	Depth	Depth ID	Analysis	Sample ID
DEEP BORINGS/SAMPLES COLLECTED IN A5A-EF						
A5A-EF101 to 5.5' deep (amsl = 575.83)	479170.2	1350331	2.5-3'	6	TAL E	A5A-EF101-6-R
			2.5-3'	6	Archive	A5A-EF101-6-V
			5-5.5'	11	TAL E	A5A-EF101-11-R
			5-5.5'	11	Archive	A5A-EF101-11-V
A5A-EF102 to 8.5' deep (amsl = 578.87)	479172.9	1350371	2.5-3'	6	TAL E	A5A-EF102-6-R
			2.5-3'	6	Archive	A5A-EF102-6-V
			5.5-6'	12	TAL E	A5A-EF102-12-R
			5.5-6'	12	Archive	A5A-EF102-12-V
			8-8.5'	17	TAL E	A5A-EF102-17-R
			8-8.5'	17	Archive	A5A-EF102-17-V
A5A-EF103 to 9' deep (amsl = 579.2)	479170.4	1350387.1	2.5-3'	6	TAL E	A5A-EF103-6-R
			2.5-3'	6	Archive	A5A-EF103-6-V
			5.5-6'	12	TAL E	A5A-EF103-12-R
			5.5-6'	12	Archive	A5A-EF103-12-V
			8.5-9'	18	TAL E	A5A-EF103-18-R
			8.5-9'	18	Archive	A5A-EF103-18-V
SAMPLES COLLECTED IN A5P						
A5P-1	479897.55	1350355.71	0'-0.5'	a	TAL C	A5P-1-a-P
			0'-0.5'	a	TAL F	A5P-1-a-S
			2.5'-3'	b	TAL C	A5P-1-b-P
			2.5'-3'	b	TAL F	A5P-1-b-S
A5P-2	479869.33	1350355.04	0'-0.5'	a	TAL C	A5P-2-a-P
			0'-0.5'	a	TAL F	A5P-2-a-S
			2.5'-3'	b	TAL C	A5P-2-b-P
			2.5'-3'	b	TAL F	A5P-2-b-S
A5P-3	479854.14	1350354.47	0'-0.5'	a	TAL C	A5P-3-a-P
			0'-0.5'	a	TAL F	A5P-3-a-S
			2.5'-3'	b	TAL C	A5P-3-b-P
			2.5'-3'	b	TAL F	A5P-3-b-S
A5P-4	479826.11	1350353.9	0'-0.5'	a	TAL C	A5P-4-a-P
			0'-0.5'	a	TAL F	A5P-4-a-S
			2.5'-3'	b	TAL C	A5P-4-b-P
			2.5'-3'	b	TAL F	A5P-4-b-S
A5P-5	479774.82	1350353.22	0'-0.5'	a	TAL C	A5P-5-a-P
			0'-0.5'	a	TAL F	A5P-5-a-S
			2.5'-3'	b	TAL C	A5P-5-b-P
			2.5'-3'	b	TAL F	A5P-5-b-S
A5P-6	479752.32	1350352.65	0'-0.5'	a	TAL C	A5P-6-a-P
			0'-0.5'	a	TAL F	A5P-6-a-S
			2.5'-3'	b	TAL C	A5P-6-b-P
			2.5'-3'	b	TAL F	A5P-6-b-S

APPENDIX C
SAMPLES COLLECTED FOR THE AREA 5 PREDESIGN INVESTIGATION

Location ID	Northing '83	Easting '83	Depth	Depth ID	Analysis	Sample ID
A5P-7	479908.39	1350285.68	0'-0.5'	a	TAL C	A5P-7-a-P
			0'-0.5'	a	TAL F	A5P-7-a-S
			2.5'-3'	b	TAL C	A5P-7-b-P
			2.5'-3'	b	TAL F	A5P-7-b-S
A5P-8	479916.86	1350485.56	0'-0.5'	a	TAL C	A5P-8-a-P
			0'-0.5'	a	TAL F	A5P-8-a-S
			2.5'-3'	b	TAL C	A5P-8-b-P
			2.5'-3'	b	TAL F	A5P-8-b-S
A5P-9	479714.48	1350272.21	0'-0.5'	a	TAL C	A5P-9-a-P
			0'-0.5'	a	TAL F	A5P-9-a-S
			2.5'-3'	b	TAL C	A5P-9-b-P
			2.5'-3'	b	TAL F	A5P-9-b-S
A5P-10	479795.14	1350506.78	0'-0.5'	a	TAL C	A5P-10-a-P
			0'-0.5'	a	TAL F	A5P-10-a-S
			2.5'-3'	b	TAL C	A5P-10-b-P
			2.5'-3'	b	TAL F	A5P-10-b-S
A5P-11	479785.14	1350516.78	0'-0.5'	a	TAL C	A5P-11-a-P
			0'-0.5'	a	TAL F	A5P-11-a-S
			2.5'-3'	b	TAL C	A5P-11-b-P
			2.5'-3'	b	TAL F	A5P-11-b-S
A5P-12	479775.14	1350506.78	0'-0.5'	a	TAL C	A5P-12-a-P
			0'-0.5'	a	TAL F	A5P-12-a-S
			2.5'-3'	b	TAL C	A5P-12-b-P
			2.5'-3'	b	TAL F	A5P-12-b-S

¹ Unpaved location where overlying material is present at the surface.

² Clean fill is present at the surface. Treat as overlying material for depth identification.

³ Actual sample depth will be determined in the field, per Section 2.1.1 of the PSP.

APPENDIX D

TARGET ANALYTE LISTS

**APPENDIX D
TARGET ANALYTE LISTS****TAL 20810-PSP-0005-A****Soil or Water Analysis, Off-Site (ASL D), 80 Samples Specified in PSP**

Analyte	FRL	Requested Minimum Detection Limit^a
Total Uranium	82 mg/kg	8.2 mg/kg
Thorium-228	1.7 pCi/g	0.17 pCi/g
Thorium-232	1.5 pCi/g	0.15 pCi/g
Radium-226	1.7 pCi/g	0.17 pCi/g
Radium-228	1.8 pCi/g	0.18 pCi/g

TAL 20810-PSP-0005-B**Soil or Water Analysis, Off-Site (ASL D), 72 Samples Specified in PSP**

Analyte	FRL	Requested Minimum Detection Limit^a
Total Uranium	82 mg/kg	8.2 mg/kg
Thorium-228	1.7 pCi/g	0.17 pCi/g
Thorium-232	1.5 pCi/g	0.15 pCi/g
Radium-226	1.7 pCi/g	0.17 pCi/g
Radium-228	1.8 pCi/g	0.18 pCi/g
Arsenic	12 mg/kg	1.2 mg/kg
Beryllium	1.5 mg/kg	0.15 mg/kg
Aroclor-1254	130 µg/kg	13 µg/kg
Aroclor-1260	130 µg/kg	13 µg/kg

TAL 20810-PSP-0005-C**Soil Analysis, Off-Site (ASL B), 24 Samples Specified in PSP**

Analyte	FRL	Requested Minimum Detection Limit^a
Aroclor-1254	130 µg/kg	13 µg/kg
Aroclor-1260	130 µg/kg	13 µg/kg

TAL 20810-PSP-0005-D**Soil Analysis, Off-Site (ASL B), 3 Samples Specified in PSP**

Analyte	FRL (WAC)	Requested Minimum Detection Limit^a
Total Uranium	82 (1030) mg/kg	8.2 mg/kg
Technetium-99	29.1 pCi/g	2.91 pCi/g

TAL 20810-PSP-0005-E
Soil Analysis, On-Site, ICMPS Method (ASL B), 8 Samples Specified in PSP

Analyte	FRL	Requested Minimum Detection Limit^a
Total Uranium	82 mg/kg	8.2 mg/kg

TAL 20810-PSP-0005-F
Soil Analysis, Off-Site, GC/MS Method (ASL B), 44 Samples Specified in PSP

Analyte	FRL	Requested Minimum Detection Limit^a
Benzo(a)anthracene	20.0 mg/kg	2.0 mg/kg
Benzo(a)pyrene	2.0 mg/kg	0.2 mg/kg
Benzo(b)fluoranthene	20.0 mg/kg	2.0 mg/kg
Dibenzo(a,h)anthracene	2.0 mg/kg	0.2 mg/kg
Indeno(1,2,3-cd)pyrene	20.0 mg/kg	2.0 mg/kg

µg/kg – micrograms per kilogram

pCi/g – picoCuries per gram

^a The minimum detection limit is set at 10 percent of the FRL or 10 percent of the WAC limit, whichever is less.